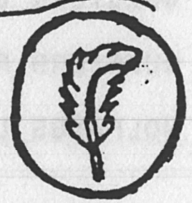


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REST OF THE WORLD - £2.



PNZ

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# EDITORIAL

HAPPY... HAPPY... DAYS ITS 1995.

CHRISTMAS IS OVER, THE HANGOVER HAS GONE WELL NEARLY?, MOTHER IN LAW IS NOW SAFELY BACK HOME, AND THE VERY BEST THING OF ALL IS WE HAVE SEEN THE OLD SPECCY SURVIVE YET ANOTHER YEAR, AND WE KNOW IN OUR HEARTS THAT IT WILL CONTINUE TO SURVIVE AS LONG AS WE ALL DO EVERYTHING THAT WE CAN TO PROMOTE THE LITTLE BLACK BOX.

NOW LETS SEE WHAT HAS BEEN HAPPENING SINCE THE LAST ISSUE OF SPEC U.K. WELL I MUST START BY GIVING YOU THE RESULTS OF JOE BLIZARDS APPEAL FOR ADVENTURERS TO WRITE IN TO HIM THAT WAS IN THE LAST ISSUE, JOE RECEIVED ONE REPLY, YES THAT IS RIGHT ONLY ONE REPLY, SO WHAT DOES THIS MEAN...? OVER THE LAST WEEK OR SO JULIE HAS BEEN BUSY GOING THROUGH ALL OF THE MAIL THAT WE HAVE RECEIVED OVER THE PAST MONTHS AND SOMETHING VERY INTERESTING HAS EMERGED.

SPECTRUM U.K MEMBERS TASTES HAVE CHANGED DRAMATICALLY, WHEN WE FIRST STARTED THE MAG INTERESTS SEEMED TO BE GAMES IE TIPS ETC, BUT ALL OF THIS NOW SEEMS TO HAVE BEEN SURPASSED WITH MEMBERS WANTING TO LEARN HOW TO PROGRAM THEIR SPECCYS FOR THEMSELVES, WHICH REALLY HAS TO BE A GOOD THING FOR THE FUTURE, AFTER ALL THAT IS WHAT THE SPECCY WAS ORIGINALLY INTENDED FOR, WITHOUT ANY DOUBTS AT ALL AMONGST THE MOST POPULAR ARTICLES IN THE MAG AT PRESENT ARE THE PROGRAMMING COURSES.

NOW BACK TO JOE,S ADVENTURE SECTION, JOE HAS WRITTEN IN TO SAY THAT BECAUSE OF THE POOR RESPONSE TO HIS APPEAL THEN HE THINKS IT BEST TO CUT DOWN HIS ADVENTURE SECTION OF THE MAG THUS MAKING ROOM FOR OTHER IDEAS THAT HE HAS,THOUGH BECAUSE HE, LIKE US KNOWS THROUGH LETTERS THAT WE HAVE RECEIVED, THERE ARE SOME OF YOU THAT STILL ARE INTO ADVENTURES HE WON'T CLOSE THE SECTION RIGHT DOWN, ON A PERSONAL NOTE I MUST SAY THAT ON BEHALF OF BOTH JULIE AND MYSELF OVER THE PAST MONTHS WE HAVE REALLY ENJOYED READING OLD WOLFANG, AND WE ARE VERY PLEASED THAT JOE HAS WISELY LEFT THE DOOR OPEN FOR HIS RETURN AT A LATER DATE, BECAUSE BELIEVE YOU ME FOLKS RETURN HE SURLEY WILL.

NOW WHATS NEXT... CAN WE ASK ALL WRITERS TO PLEASE LET US HAVE YOUR COPY BY THE VERY LATEST FIVE DAYS BEFORE WE GO TO PRINT, IE ON THE TENTH OF THE RELEVANT MONTH, THIS WILL HELP US ENORMOUSLY AND WILL MEAN THAT WE WON'T HAVE TO MISS OUT ANYONES ARTICLES AND BRING THEM OVER TO THE NEXT ISSUE, WHICH SADLY WE HAD TO DO WITH NICKS BACK TO THE +3 WHICH HE SENT IN JUST TOO LATE FOR US TO INCLUDE IN THE CHRISTMAS ISSUE, IT MAY SEEM A LITTLE ODD READING HAPPY CHRISTMAS IN NICKS ARTICLE THIS MONTH, BUT HE WENT TO THE TROUBLE TO WRITE HIS ARTICLE, SO WE FEEL IT ONLY FAIR TO INCLUDE IT IN THIS ISSUE AND HOPE THAT YOU ENJOY IT.

YOU WILL NOTICE IN THIS ISSUE THAT WITH YOUR HELP WE ARE SLOWLY BUILDING UP A NICE NUMBER OF REPAIR FIRMS SPREAD ACROSS THE UK, PLEASE KEEP SENDING IN COMPANIES ADDRESSES THAT YOU CAN RECOMMEND BECAUSE BY DOING THIS THEN IT WILL HELP MEMBERS LOCATE A LOCAL REPAIR FIRM TO THEM.

# EDITORIAL

SPECTRUM U.K MUST GROW...

WE URGENTLY NEED MORE MEMBERS TO WRITE FOR THE MAG IT NEEDN'T BE ON A REGULAR BASIS, BUT IF WE ARE TO GROW THEN YOU MUST HELP US, WITHOUT YOU SPECTRUM U.K IS NOTHING WE DON'T WANT TO STOP AT AROUND 50 PAGES EACH ISSUE, LETS TRY AND GO FOR AROUND 80 OR MORE WHY NOT, WITH YOUR HELP ANYTHING IS POSSIBLE, SO COME ON FOLKS GET TO IT, SEND US YOUR ARTICLES NOW.

YOU CAN WRITE ABOUT ANYTHING AT ALL, A SINGLE PROGRAM, SOME TIP THAT YOU HAVE DISCOVERED, FULL ARTICLES IF YOU WISH, BUT PLEASE DO GET INVOLVED, BECAUSE WITHOUT YOU SPECTRUM U.K WILL HAVE TO BE RENAMED, WEIGHT WATCHERS U.K.

WE HAVE RECEIVED SOME EXCITING NEW GAMES FROM EUROPE WHICH WE DID WANT TO REVIEW IN THIS ISSUE, BUT UNFORTUNATELY WE COULDN'T GET IT TOGETHER IN TIME, HOWEVER I CAN TELL YOU THAT THEY REALLY ARE VERY GOOD INDEED AND WILL RECEIVE A FULL REVIEW IN THE NEXT ISSUE

NEXT APOLOGIES FOR THE PRINT QUALITY OF THE CHRISTMAS ISSUE, WE ARE SORRY ABOUT THAT FOLKS, NO IT WASN'T THE PRINTERS FAULT, BESSIE THE TELEX DECIDED TO GET A BIT NAUGHTY AND HER PRINTER HEAD WENT ON STRIKE...IE HAYWIRE ACTUALLY, MIND YOU THE AMOUNT OF PRINTING SHE HAS DONE OVER THE LAST YEAR IS FRIGHTENING.

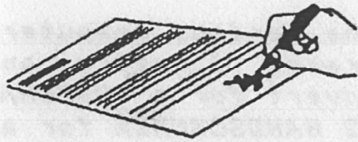
LASTLY BUT BY NO MEANS LEAST, CAN WE ON BEHALF OF US HERE AND ALL THE MEMBERS OF SPECTRUM U.K WISH RICCY BUTLER (THE INTENSE COLLECTOR) A SPEEDY RECOVERY, RICCY HAS BEEN VERY ILL FOR QUITE A WHILE NOW, AND WE MISS HIM, SO GET WELL MATE AND LETS BE HAVING YOU BACK ON BOARD WHERE YOU BELONG.

WELL THAT JUST ABOUT COVERS EVERYTHING FOR THIS ISSUE FOLKS, WE HOPE THAT YOU ENJOY THE MAG, PLEASE DON'T FORGET TO WRITE THE ODD ARTICLE FOR INCLUSION, IN THE MEANTIME KEEP WELL AND HAPPY, AND REMEMBER...ALWAYS KEEP THE FAITH.

SEE YOU ALL IN THE APRIL ISSUE.....BYE NOW.

ROY AND JULIE.

THE NEXT ISSUE OF SPECTRUM U.K. WILL BE OUT ON THE 15TH APRIL



## DILLAN'S

## D E N

THE VIEWS AND COMMENTS ARE OF MY OWN PERSONAL THOUGHTS AND BELIEFS AND NOT THAT OF THE CLUBS.

HI.. ME AGAIN!! HOPE EVERYONE IS WELL, AND INTO THE ACT OF

SUBSCRIBING TO:-  
SPECTRUM  
UK



## S T O C K C O N T R O L

I will start this month with a letter from KEVIN MILES from CARDIFF who wrote sayings

There is a small electrical

shop near where I live that is using a SPECTRUM 48K PLUS, which is linked to a Disc-Drive, listing all the current stock that is for sale.

This machine is on for a good 10 hrs per day, every day, with no problems, (apart from the obvious Disc cleaning kit) in the last 7 years.



## IS THIS A RECORD?

Dill replies..... This sounds like it is definitely a record, a full 7 years use, every day for a full T E N hours...brilliant, a b s o l u t e l y brilliant, what a great achievement, (PC eat your winchester out) to have such a reliable, cheap source of computer for stock control, without any major problems or repairs.

## DO THEY KNOW ABOUT SPECTRUM UK ?

## TEXT TOO TINY

PHILLIP WHITE writes with a

complaint....

I can't read DILLAN's DEN very clearly due to the fact the text is far too small.

Dill replies... Sorry phil, but I have limited space in the SPECTRUM UK magazine. So I like to put as much as possible into the restricted area.

However, I have researched into this field at the beginning of DILLAN's DEN (the early days) and looked at other magazines including various computer mags, news paper's, news letter's, etc and must say that most of the text sizes are much smaller, in some cases some look like there is no spaces after each word.

So the size of text that I use is much larger than some others.

Perhaps the new A4 size may cure this too!

## SPECCY SET UP

ROB from CHORLEY ask's....

What set up has DILLAN got?

Dill replies.. Hell Bob, the set up I have is:

48K Rubber keyboard,  
 48K housed in a  
 DK'TRONIC's  
 keyboard, with  
 interface one, two  
 sets of micro-drive  
 units, 128K plus,  
 128K plus 3, with 3"  
 disk drive, (anyone  
 got any cheap disks  
 for sale?) +D  
 interface with  
 'SNAPSHOT' feature  
 (excellent) a DATEL  
 3.5" disk-drive,  
 Furguson Program  
 Data-Recorder (the  
 best ever made)  
 various interfaces,  
 joysticks, mouse,  
 light pen etc. A  
 large collection of  
 software on tape,  
 disc and micro-  
 drive, including  
 various art  
 packages, business  
 and word processors  
 etc.

These are all  
 used for the  
 production of the  
 article's.

Oh and a QL, (anyone  
 interested???)  
 I hope that answers  
 your question Rob.

ROB has been  
 with SPECTRUM UK,  
 for about six months  
 now. He says he was  
 the first person in  
 CHORLEY to purchase  
 a 48K rubber  
 keyboarded model.

**CONGRATS  
 ROB.....  
 WAS IT  
 RUMBELOWS?**

DOUGLAS from SLOUGH  
 ask's...

"Does Dillan  
 use a DIGITIZER for  
 his page?"

Dill replies...

**NO!**  
 Just a 'SNAPSHOT',  
 +D, disk-drive and a  
 good printer  
 (CITIZEN 120D) to  
 produce some picies  
 you see, although  
 some of the pictures  
 I use, have been  
 digitized or scanned  
 drawings, photo's or  
 clipping's etc and  
 saved to disk as a  
 'PCX' file.



A 'SCANNED' PICTURE.

The Digitizer,  
 or Graph pad is, in  
 my opinion is a very  
 good idea but very  
 expensive, but if  
 you can get a good  
 working second hand  
 model then why not.

Back in the  
 good old day's  
 (1984) a graphpad or  
 graph-tablet etc,  
 etc, would cost  
 around £156.00ish  
 then, as these were  
 few and far between,  
 how much now?.....

Looking through

the various computer  
 press, I notice an  
 advert for a 'NAKSHA  
 32 HANDSCANNER for a  
 mere £49.00 from:-

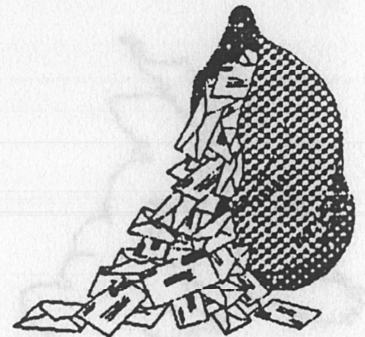
**SRS LTD  
 94, THE PARADE,  
 WATFORD,  
 HERTS, WD1-2AH**

(But will it run off  
 the humble speccy...  
 who knows?)

Drop them a  
 line, they also sell  
 SPECTRUM's too, dirt  
 cheap.

Well that about  
 wraps it up....

**KEEP THE LETTERS  
 COMING  
 THICK AND FAST**



**THAT'S ALL FOLKS!**

UNTIL

NEXT

MONTH



**DILLAN**

TEL:0592-642426

# SOFT

# OPTIONS

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ORIGINALS

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ORIGINALS

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Lead, Joystick and Starter Games  
Pack (Plus manuals whenever  
possible). Please include £5.00 p+p.

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**POWER SUPPLIES etc.**

---

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\*\*\*\*\*  
R  
R

# NOTICE BOARD

R  
R  
R  
R  
R  
R

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- R COMPUTER TO TV AERIAL LEAD-----£2.99P
- R 20 INDIVIDUAL SPECTRUM GAMES-----£14.99P

R  
R  
R  
R

ACCESS/VISA WELCOME, PLEASE MAKE CHEQUES/POSTAL ORDERS PAYABLE TO  
OMNIDALE SUPPLIES, ALL PRICES INCLUDE V.A.T AND POSTAGE/PACKING.

\*\*\*\*\*

R  
R  
R  
R  
R  
R

RICHARD COLES  
7 MANOR DRIVE  
MERRION  
SOMERSET TA16 5NT

R  
R  
R  
R  
R  
R  
R  
R  
R  
R  
R

RICHARD HAS WRITTEN IN TO ASK IF ANY MEMBERS KNOW OF OR OWN A  
JUPITER ACE COMPUTER, IT DIDN'T COME WITH BASIC, BUT USED FORTH,  
IT WAS DESIGNED BY THE SAME FOLKS RESPONSIBLE FOR MOST OF THE  
DESIGN WORK ON THE EARLY SPECTRUMS,IF ANY OF YOU CAN HELP RICHARD  
OR WOULD LIKE A PHOTOCOPY OF WHAT INFORMATION THAT HE HAS ON THE  
JUPITER ACE, THEN PLEASE WRITE TO HIM AT THE ABOVE ADDRESS  
PLEASE REMEMER TO ENCLOSE AN S.A.E AND 5P IF YOU WANT A PHOTOCOPY

\*\*\*\*\*



NOTICE BOARD

J.R.C. CAMERA REPAIRS

2 FORBE COTTAGE
THE STREET
EWELME
OXON OX10 6HQ
TELEPHONE/FAX 0491 834403
MOBILE 0850 976524

WE WOULD LIKE TO DRAW TO YOUR ATTENTION THE REPAIR SERVICE THAT WE PROVIDE FOR SPECTRUM USERS. AS YOU ARE AWARE OF THE DIFFICULTY AND THE SHORTAGE OF MANY OF THE PARTS FOR SERVICING, OUR POLICY IS TO GIVE AN ESTIMATE FREE BEFORE COMMENCING ANY WORK AFTER ACCEPTANCE, AN INVOICE WILL NOT BE SENT UNTIL THE EQUIPMENT HAS BEEN THOROUGHLY TESTED. THIS WAY WE CAN INSURE THAT ONLY EQUIPMENT THAT WE HAVE SPARES FOR WILL BE CHARGED FOR.

ALSO WOULD IT BE POSSIBLE FOR YOU TO INSERT IN YOUR NEXT ISSUE A FEW LINES INFORMING YOUR READERS THAT WE HAVE A FEW MICROVITEC CUB MONITORS FOR SPECTRUMS 128+2 +2A AND +3 FOR SALE AT £89.95P WHICH INCLUDES THE CORRECT LEADS. CARRIAGE AND INSURANCE EXTRA.

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TEL/FAX (0772) 632686

WE OPERATE A POSTAL REPAIR SERVICE, AT THE ABOVE ADDRESS, AND OFFER A 24 HOUR (JUST ABOUT..) TELEPHONE HELP AND ADVICE SERVICE. WE DO NOT STOCK ACTUAL HARDWARE OR SOFTWARE ANYMORE, SINCE THE DEMAND HAS SOMEWHAT REDUCED OVER THE LAST FEW MONTHS, BUT WE CAN REPAIR JUST ABOUT ANYTHING. THE AVERAGE REPAIR TIME IS 24 HOURS.

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PLUS 3 DISC DRIVES-NEGOTIABLE
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THESE PRICES INCLUDE FULL NECESSARY REPAIRS, AND THE RETURN INSURED POSTAL COSTS. WE DO, QUITE OBVIOUSLY, RESERVE THE RIGHT NOT TO REPAIR AN ITEM, SHOULD WE DEEM IT TO BE BEYOND ECONOMICAL REPAIR, BUT IN THIS INSTANCE WE WOULD RETURN THE ITEM WITH A LETTER OF EXPLANATION, TOGETHER WITH THE CUSTOMERS CHEQUE.

# NOTICE BOARD

GREAT NEWS FOLKS MILES KINLOCH HAS WRITTEN IN WITH SOME MORE REALLY AMAZING PROGRAMS THAT HE HAS BEEN BUSY WRITING, THEY ARE JUST BRILLIANT, THE FIRST TWO ARE MULTIBASIC AND MF-MAXIRAM, KNOWING HOW POPULAR MILES WORK IS AMONGST THE MEMBERS WE THINK IT BEST IF WE PRINT HERE MILES DESCRIPTION OF THESE TWO EXCELLENT PROGRAMS THAT HE SENT IN WITH HIS DISK, THAT WAY YOU ALL WILL HAVE A COPY, AND THEN ANYONE WHO WANTS THE PROGRAMS CAN JUST WRITE IN ENCLOSING A DISK AND S.A.E TO THE USUAL ADDRESS.

MEMBERS MUST REMEMBER THOUGH TO RUN THESE GREAT PROGRAMS YOU HAVE TO OWN THE DISCIPLE VERSION OF MULTIFACE 128, IF BY THE WAY ANY OF YOU WOULD LIKE TO BUY A DISCIPLE VERSION OF MULTIFACE 128 THEN MILES SAYS IN HIS LETTER THAT, ROMANTIC ROBOT STILL HAVE AROUND A 100 OF THEM IN STOCK, AND ARE CURRENTLY OFFERING THEM AT THE SPECIAL PRICE OF £19.95P, TAKE A TIP FOLKS IF YOU HAVEN'T GOT ONE THEN GET IN THERE QUICK AS ITS THE DISCIPLE VERSION THAT IS THE ONLY ONE THAT WILL WORK WITH THE +D.

NOW BEFORE GOING ON TO MILES LATEST BRILLANT PROGRAM, I WANT TO ASK ALL OF YOU WHO OWN A +D REGARDLESS OF WHICH SPECTRUM YOU HAVE IT HOOKED UP TO, DO ANY OF YOU SUFFER FROM THE FOLLOWING...?

DO YOU SOMETIMES GET A RESET WHEN YOU EXIT FROM THE SNAPSHOT ROUTINES, IE, EITHER BY PRESSING 'X' OR AFTER MAKING AN ACTUAL SNAPSHOT, AND IF YOU HAVE MADE A SNAPSHOT AND HAD IT CRASH, THEN DO YOU FIND THAT THE SNAPSHOT ITSELF WILL CRASH ON LOADING, IF ANY OF YOU ARE SUFFERING FROM THIS, THEN PLEASE DO WRITE IN, SAYING HOW OFTEN IT HAPPENS AND WHAT SPECCY YOU ARE HOOKED UP TO, BECAUSE IT SEEMS THAT QUITE A FEW OF YOU ARE HAVING THIS PROBLEM.

NOW ONTO MILES MASTERPIECE THATS THE ONLY WORDS FOR IT, HIS LATEST PROGRAM IS TITLED, SNAPFIX... AND THAT IS EXACTLY WHAT IT DOES, IT CURES THE ABOVE PROBLEM BRILLIANTLY, THOUGH IT MUST BE SAID THAT IT WON'T ENTIRELY ELIMINATE SNAPSHOT CRASHES, BUT THEY SHOULD BE VERY RARE, SO ONCE AGAIN IF ANYONE WANTS A COPY OF, SNAPFIX, THEN JUST SEND IN A DISK AND S.A.E AND YOUR PROBLEMS ARE SOLVED.

AND FINALLY ON BEHALF OF SPECCY FANS EVERYWHERE WE WOULD LIKE TO THANK MILES FOR HIS GREAT PROGRAMS AND DEDICATION TO THE HUMBLE SPECTRUM, MANY THANKS MATE.

PENPAL UK  
348 QUINTON  
LOWER FALINGE  
ROCHDALE LANCs  
OL12 6RE

IF ANYONE WOULD LIKE A PENPAL THEN OUR KARENS YOUR GAL  
WRITE TO HER AT THE ABOVE ADDRESS.

# MULTIBASIC AND THE USE OF MULTIFACE RAM

*This article refers to the Disciple version of Multiface 128.*

## GENERAL

MULTIBASIC consists of a short routine of 251 bytes, which, via the +D, adds new commands to BASIC for accessing Multiface memory. These let you POKE and PEEK it just as easily as you could normal Spectrum memory, and, perhaps most usefully of all, move blocks of code in and out of its RAM. Apart from the obvious convenience, it also unlocks the door for people who might want to use the device for storage, but are perhaps put off by the need to do it from machine code.

The new commands detect if the Multiface is either disabled or not attached, and will then just stop with an error report. This side effect can be useful in itself where you simply need a means of determining the status of the device. (See the start of MULTIDEMO 3 as an example.)

One of the main advantages of the Multiface RAM is its immunity from resets, but up till now, there has been a drawback: except when you program it for 'direct jump' mode, in reality you only have a little over 5K, as 8192-11144 is used as a buffer when the menu is displayed. Because the device is always *disabled* after a reset, there would seem to be no way round this, as you must always press the button first to enable it...

This is where MF\_MAXIRAM comes in. This utility, consisting of a small routine embedded in a BASIC REM statement, programs the Multiface to bypass the menu when enabling it. As a result, nearly the whole 8K becomes available for use, free from any danger of corruption. To cancel MF\_MAXIRAM and restore normal Multiface operation, just press the button while holding down the Break key.

## TECHNICAL INFO

Under normal circumstances, when you set up the Multiface to jump directly, it becomes disabled again on returning to your program. This is because of the RST 0 routine in Multiface ROM, which you would normally use. There is, however, an alternative to RST 0, which will NOT disable the device on returning. This is in fact the principle behind MF\_MAXIRAM, and the secret lies in an undocumented Multiface port.

Ports 191 and 63, normally used with an IN instruction to page the Multiface memory in and out, can also be used in *output*, i.e. OUT (191),A and OUT (63),A. Here, their function is totally different, and because they don't have anything to do with ROM paging, you can also use the BASIC OUT command here. (The value output to the port is irrelevant.)

The purpose of OUT 63 is to disable the Multiface, and as this instruction is executed by the RST 0 routine, this accounts for it being off afterwards. A disassembly of the Multiface ROM, however, reveals alternative entry points at which the 'return to program' routine can be called. If you want to program the Multiface for 'direct jump' so it remains enabled afterwards, substitute the following piece of code for the normal RST 0:-

```
CALL 3052
XOR A
LD (8198),A
CALL 1420
```

In actual fact, that's all there is to MF\_MAXIRAM, apart from a routine to await a keypress. (It may look a bit strange to end a program in CALL, without any subsequent JUMP or RET, but don't worry - the Multiface ROM routine POPS the return address afterwards!)

## SNAPFIX

### Technical Info

For anyone interested in the technical aspects of the snapshot crashing problem, I'll try to clarify things, at least from a software angle, in this short article. I'll describe things from the point of view of the grey +2.

When the effect happens, it's because the NMI (Non-Maskable Interrupt) mechanism is going wrong somewhere when the +D's button is pressed. When the Z80 receives an NMI signal, the current Program Counter is preserved (pushed) on the stack, and a call made to address 102 (decimal), where it executes the NMI service routine (i.e. the snapshot routine). The +D hardware simultaneously detects when a call is made to this address, and then takes immediate action to page itself in, so it will be the NMI routine in +D ROM, rather than the one in the Spectrum ROM (which contains a fatal bug anyway), that's executed.

That, at any rate, is what's MEANT to happen, and indeed when it does work that way, all goes well. On the occasions that it crashes, however, something very unusual occurs. It's almost as if the above process were carried out all over again A SECOND TIME, a split second later. - just when the Program Counter is actually at address 102, in fact. Now, try to imagine what would then ensue: the next address, 103, would therefore be stacked, so when you returned to your program, it would resume from there. By that time, however, the Spectrum ROM would be paged back in again, so it wouldn't be address 103 in the +D that was executed, but in the Spectrum ROM instead, i.e. plunging into the Speccy's own bugged NMI routine, and heading straight for a reset!

Strange though the above may seem, all the experiments I have done seem to point to this happening. For instance, if I go into 48K and POKE either 23728 or 23729 (the latter is better, since 23728 also functions as an error-trap with the +D) with a non-zero value, I can then press the snapshot button as often as I like, and it never crashes afterwards. This is consistent with the bug in the Spectrum's routine at 102, the result of which is to cause a jump to address 0 when both 23728 and 23729 hold zero, but to RET harmlessly (albeit having achieved nothing) otherwise.

There are some games in which the crashing symptom never happens, however many times the snapshot button is pressed, and these always turn out to be ones which overwrite the BASIC area and put values into 23728/23729!

Incidentally, in 128 mode, POKEing 23728/23729 doesn't help, as the 128K shadow ROM doesn't contain any NMI routine at all - not even a bugged one! A call to 102 in it will inevitably spell disaster.

Hackers Workbench is an excellent tool for examining snapshots, and when I use it to look at the state of the Z80 registers in a snapshot which crashes on loading, the 'Program Counter', i.e. representing the stacked return address to be jumped to,

invariably shows as 103.

Finally, a most unlikely utility proved invaluable in analysing the problem - Plus D Poker! Invaluable because it allowed me to look at the stack AFTER the snapshot button had been pressed, and examine the return address. On every occasion when it crashed on returning, the address was always 103, and using this method, I found I could always predict in advance the occasions when it was about to happen.

By now, I was convinced beyond any doubt about what was going on, and I decided the next step would be to write a routine to fix the problem. Perhaps neutralise might be a better word, as, of course, the underlying hardware bug is still there - but to all intents and purposes it can be regarded as cured. There are two versions: G-SNAPFIX is the version for G+DOS and B-SNAPFIX, the one for Betados. The patch should be compatible with all DOS resident utilities and system-file modifications, since it overwrites some redundant code, rather than using the spare +D RAM at the end.

So how does SNAPFIX work? Well, whenever the +D's button is pressed, the first thing the snapshot routines do is store the current stack pointer in addresses 16382/16383, before setting up a temporary stack in +D:RAM. The routine looks at the stack represented in 16382/16383 and tests if the return address on it is 103. If so, it increments the contents of 16382/16383 to 'drop' this address, so the one before it, i.e. the genuine return address, will be used instead. The result is a snapshot button which, at least in my case, is now much more reliable.

Miles Kinloch

# SPECCY MAGIC

Enter this program and run it.

```
10 REM SPECCY MAGIC
20 LET A$="SPECCY MAGIC"
30 FOR N=12 TO 0 STEP -1
40 PRINT AT 10,10; PAPER N/2;
   INK 6-(N/2); INVERSE 1;A$;
50 IF N=10 OR N=8 OR N=6
   OR N=3 OR N=1 THEN GO TO 70
60 BEEP .2,N: PAUSE 5
70 NEXT N: FOR X=1 TO 100
80 POKE 22527+RND*704,RND*127
90 NEXT X: RUN
```

(You don't like it? Then NEW it and enter your own short program. I don't care) Now enter as a direct command POKE 23755,64. WOW! It's gone!! Now enter POKE 23755,0. Double wow! It's back!! Phew!!! How did it do that? Well, it's all to do with line numbers, and we know all about line numbers in the dear old Speccy, don't we (do we?).

## SPECCY LINE NUMBER STORY PART I

Line numbers go from 0 to 9,999 (of course!). Take that first program line, number 10. If you look at the first two bytes of that line in the Basic Program section of memory you will see that the first byte is 0 (zero) and the second byte 10 (PRINT PEEK 23755;" ";PEEK 23756). You can change the line number by POKEing numbers into each byte (address) in turn. Look what control you can have over the Speccy, makes you feel good, doesn't it? But Speccy has the last word!! If the new number is greater than the number of the second line then Speccy won't play! Why not? (work it out yourself). Now POKE 23755,39:POKE 23756,15. It is now line number 9,999.  $((39*256)+15=9,999)$ .

## SPECCY LINE NUMBER STORY PART II

This is the end of the line numbers? Just for fun POKE 23756,16. Well, what's this? A colon and three zeros? Actually it shows Speccy's impeccable logic. Unable to fit a two-digit decimal number into one space it puts in the next character to the 9 in the Character Set, the colon. This is Speccy's best effort at signifying line number 10,000!! Now, you POKE in higher numbers in the two addresses and see what characters emerge at lines 11,000 and 12,000 and upwards. There is the semi-colon, the less-than sign, the equals sign, and so on until the @ just before the beginning of the alphabet.

## SPECCY LINE NUMBER STORY PART III

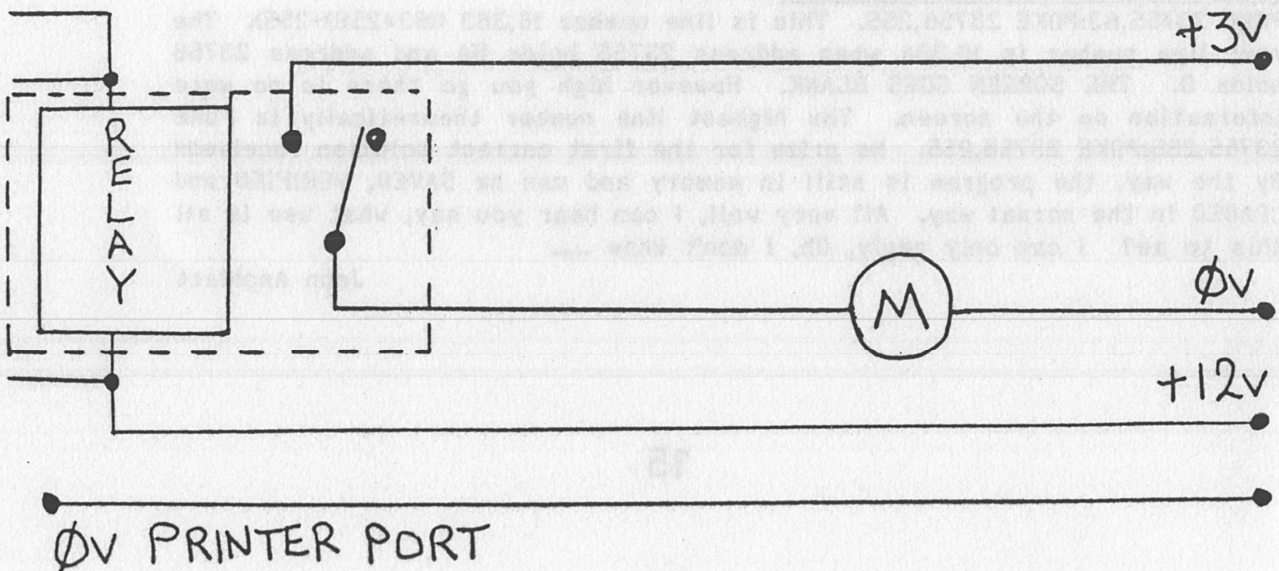
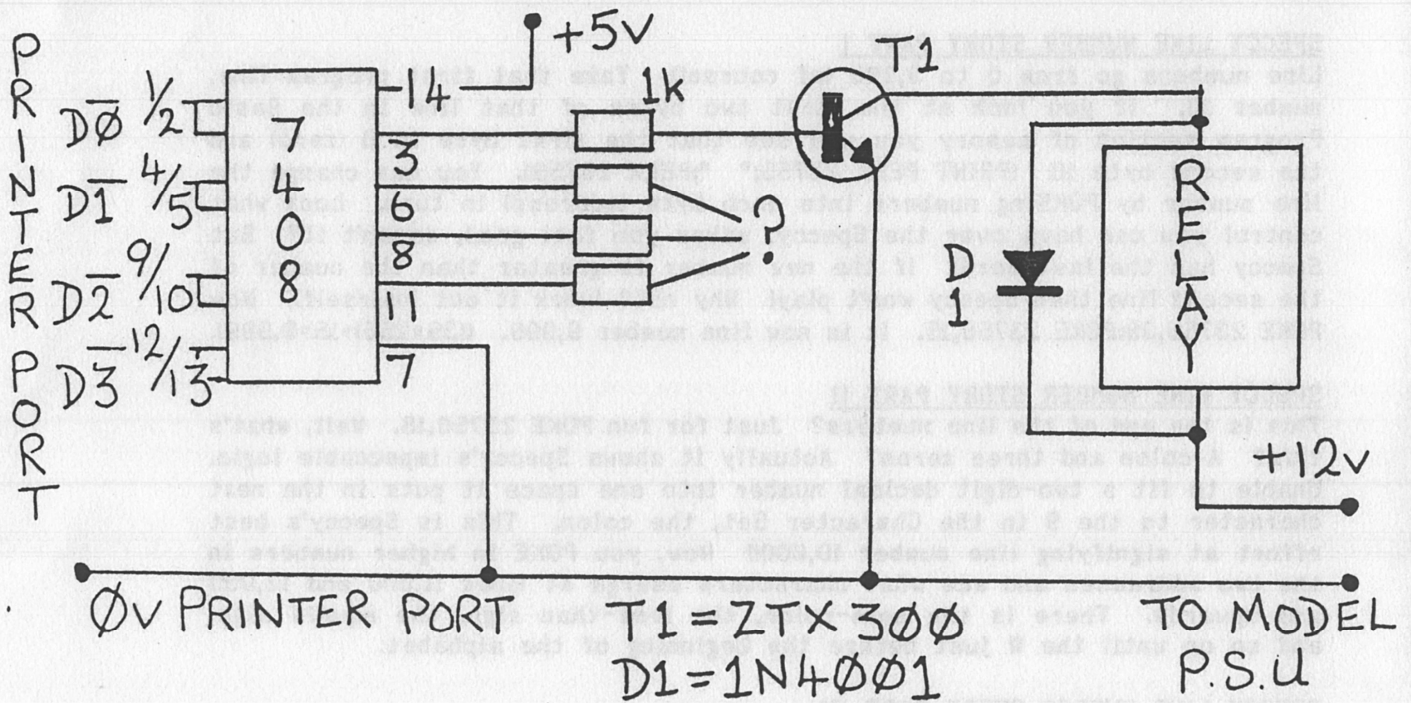
POKE 23755,63:POKE 23756,255. This is line number 16,383  $((63*256)+255)$ . The next line number is 16,384 when address 23755 holds 64 and address 23756 holds 0. THE SCREEN GOES BLANK. However high you go there is no more information on the screen. The highest line number theoretically is POKE 23755,255:POKE 23756,255. No prize for the first correct solution received!! By the way, the program is still in memory and can be SAVED, VERIFIED and LOADED in the normal way. All very well, I can hear you say, what use is all this to me? I can only reply, Oh, I don't know .....

John Amphlett

## ROBOTIC INTERFACE

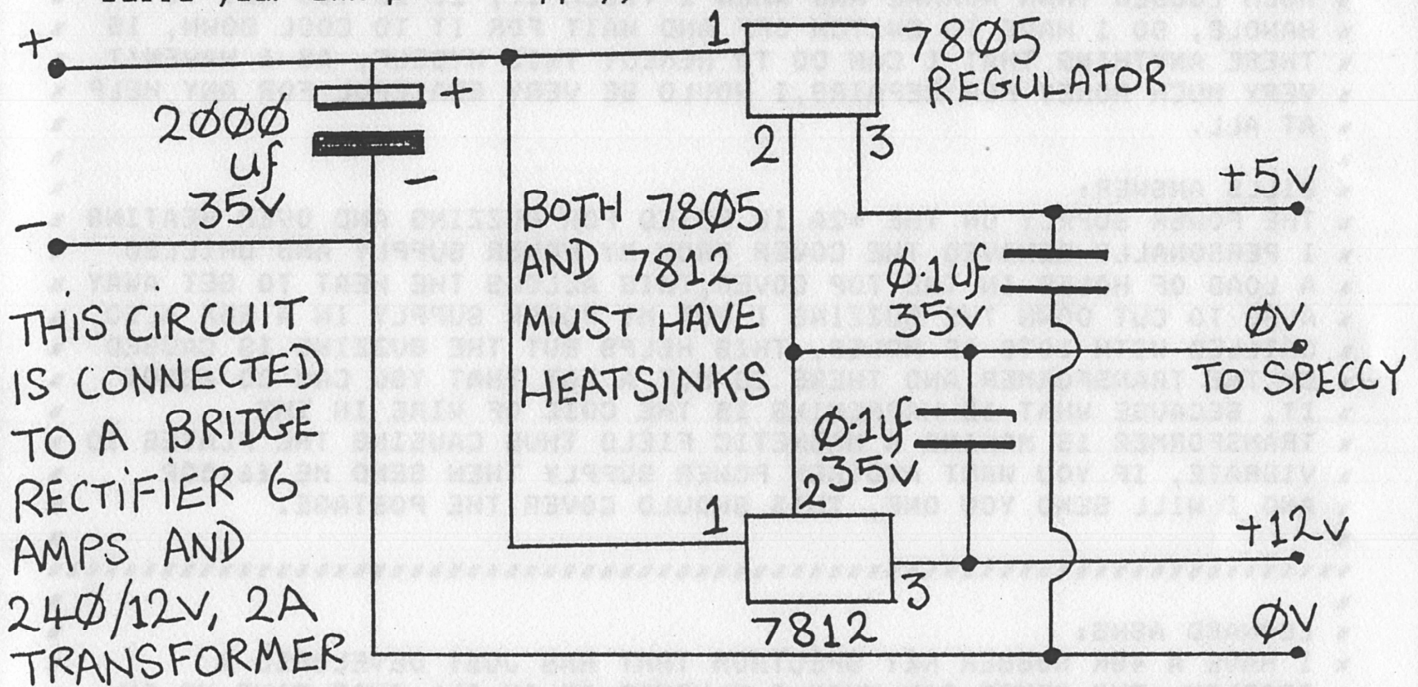
There was a time, back in the early eighties when interfacing your computer with a robot or buggy seemed to be a necessity. A whole range of fashionable add-ons existed, from robotic arms, to turtles...? This was fine, although the cost usually deterred most speccy owners.

Nowadays the only option available would be to build your own, and this has been well documented over the years. One major problem however has been the Spectrum i/o port which needs its address lines decoded to operate any add-on devices. For the more experienced builder this has never been a problem, but for the novice it could represent a real headache. There is one way to overcome this especially for the +2a,+3 owner, and that is to use the printer port. It has the eight data lines which are needed to operate a simple model, and be addressed using the OUT command in +3 BASIC. Giving the command OUT 4093,1 would send a signal down data line D0. To stop this signal simply send OUT 4093,0. The circuit given below is a easy to build model controller using 12v relays. I hope by approaching this in very basic terms it will be of intrest to those of you who are not very electrically minded, like myself...?





You will need to refer to your manual for printer, and i/o port connections. Data lines from the printer port are connected to a 7408 quad AND gate. This acts as a buffer, with each line connected to a transistor. When a signal is sent, the transistor is turned on, activating the relay. Diodes are inserted purely as a protective measure. Depending on the application, this circuit could be doubled up to include all eight data lines. Relays are used as switches, allowing an electric motor to be turned on and off, forward and reverse. They also separate the models power supply from the interface circuitry. Connecting just four lines to operate two small electric motors, relays could be used to turn the power on and off independently, and give forward and reverse. Choosing which type of relay to use as described above can be very confusing. I have used items YX94C and DC80B bought from Maplins, which are two very useful relays. Incidentally all of the components shown can be purchased from Maplins. As you can see from the diagram, a regulated +5v and +12v supply must be produced. In the past i have tapped the i/o port for both these voltages using four data lines to operate four relays (two YX94C and two DC80B) on my +2a very successfully. Considering the +2a only supplies 12v @ 200ma, it would seem a better option to build your own power supply, as shown below.



If this is starting to look complicated, then one alternative could be to tap the +5v supply from the i/o port because only a few milliamps are required, this would then leave the +12v. Maplins supply regulated power packs which when set to +12v would eliminate the construction of the power supply unit. However these are expensive, and it still remains to power the model...?

Always insure that the model operates on a low voltage. Typically i have used 3v to 4.5v which have been ideal. Building this interface described above can produce a unit that is totally reliable, and will give hours of fun, experimenting and programming.

Kevin Gurd.

ASK



BILL

HELLO FOLKS AND WELCOME TO ANOTHER ASK BILL SESSION, RIGHT LETS NOT HANG ABOUT, OFF WE GO...

BARRY ASKS:

I WONDER IF BILL CAN HELP ME WITH THE FOLLOWING, THE SPECCY THAT I USE IS A +2A BLACK 128K, WHICH WORKS PERFECTLY, BUT AFTER ABOUT AN HOUR OR SO THERE IS A VERY LOUD HUMMING COMING FROM THE PSU, MUCH LOUDER THAN NORMAL AND WHEN I TOUCH IT, IT IS TOO HOT TO HANDLE, SO I HAVE TO SWITCH OFF AND WAIT FOR IT TO COOL DOWN, IS THERE ANYTHING THAT I CAN DO TO REMEDY THIS MYSELF, AS I HAVEN'T VERY MUCH MONEY FOR REPAIRS, I WOULD BE VERY GRATEFUL FOR ANY HELP AT ALL.

BILLS ANSWER:

THE POWER SUPPLY ON THE +2A IS NOTED FOR BUZZING AND OVER HEATING I PERSONALLY REMOVED THE COVER FROM MY POWER SUPPLY AND DRILLED A LOAD OF HOLES IN THE TOP COVER, THIS ALLOWS THE HEAT TO GET AWAY ALSO TO CUT DOWN THE BUZZING I PUT MY POWER SUPPLY IN A BOX ALSO DRILLED WITH LOTS OF HOLES, THIS HELPS BUT THE BUZZING IS CAUSED BY THE TRANSFORMER AND THERE IS NOT A LOT THAT YOU CAN DO ABOUT IT, BECAUSE WHAT IS HAPPENING IS THE COIL OF WIRE IN THE TRANSFORMER IS MAKING A MAGNETIC FIELD THUS CAUSING THE PLATES TO VIBRATE, IF YOU WANT ANOTHER POWER SUPPLY THEN SEND ME £6.50P AND I WILL SEND YOU ONE, THIS SHOULD COVER THE POSTAGE.

LEONARD ASKS:

I HAVE A 48K RUBBER KEY SPECTRUM THAT HAS JUST DEVELOPED A PROBLEM, THE OTHER DAY WHEN I PLUGGED IT IN ALL THAT CAME UP ON THE SCREEN WAS A LOAD OF GREY INTERFERENCE, AND THE KEYBOARD HAD LOCKED UP, I HAVE A COUPLE MORE 48K SPECCYS BUT I WOULD LOVE TO HAVE A BASH AT MENDING THIS ONE, IF POSSIBLE CAN BILL GIVE ME ANY POINTERS AS TO WHERE THE PROBLEM MIGHT BE, WITH THANKS LEONARD.

BILLS ANSWER:

I DON'T TRY TO REPAIR MY SPECTRUMS AS YOU HAVE TO KNOW A BIT ABOUT ELECTRONICS AND YOU NEED AN OSCILLOSCOPE TO FIND WHERE THE PROBLEM IS, IF I REMEMBER CORRECTLY IN ISSUE 9 JULY, PETER BEARDWOOD WROTE A SERIES OF EXCELLENT ARTICLES COVERING REPAIRING A 48K SPECTRUM, AND ALSO IF YOU WRITE IN TO SPECTRUM UK, YOU CAN BORROW THE GROUPS 48K REPAIR MANUAL, THOUGH PLEASE REMEMBER TO ENCLOSE AN S.A.E.

ASK



BILL

PETER ASKS:

I HAVE BEEN USING A SPECTRUM +3 FOR MANY YEARS NOW, BUT HAVE RECENTLY SWITCHED OVER TO A +2 GREY 128K LINKED TO A +D, MY REASONS FOR DOING THIS WAS THAT THE COST OF +3 DISKS WAS TOO EXPENSIVE, NOW WHAT I WOULD LIKE TO DO IS SWITCH ALL OF MY 3 INCH DISK PROGRAMS OVER TO 3.5 DISK, COULD BILL TELL ME IF THERE IS ANY WAY OF DOING THIS.

BILLS ANSWER:

THE SOFTWARE YOU HAVE ON 3 INCH DISK, YOU DON'T SAY IF IT IS YOUR OWN PROGRAMS OR GAMES OR COMMERCIAL SOFTWARE. THERE IS A WAY TO TRANSFER YOUR OWN PROGRAMS TO 3.5 DISK, BUT YOU WILL NEED A TAPE RECORDER AND THE SPECIAL LEAD THAT CONNECTS IT TO THE +3, SO ASSUMING THAT YOU HAVE THE LEAD THEN CONNECT UP TO THE +3 AND TO THE EAR SOCKET OF YOUR TAPE RECORDER, NOW LOAD YOUR PROGRAM INTO THE +3 AND WHEN IT HAS LOADED PRESS BREAK AND LIST THE PROGRAM, NOW TYPE, SAVE 'PROGRAM NAME' AND PRESS RECORD ON YOUR TAPE RECORDER, NOW PRESS ENTER ON THE +3, THIS SHOULD SAVE THE PROGRAM TO TAPE, NOW YOU CAN LOAD THE TAPE INTO THE GREY +2 READY TO TRANSFER IT TO 3.5 DISK.

IF HOWEVER YOU WISH TO TRANSFER COMMERCIAL SOFTWARE THEN TO DO THIS YOU WILL REQUIRE A 3.5 DISK DRIVE TO BE CONNECTED TO THE +3 AND THIS CAN BE A VERY COSTLY WAY TO TRANSFER THE PROGRAMS THAT YOU WANT, IN MY OPINION YOU WOULD BE FAR BETTER OFF BY TRYING TO GET THE SOFTWARE YOU WANT AND THEN JUST LOAD IT STRAIGHT INTO THE +2.

CLAIRE ASKS:

HELP BILL, I HAVE A 48K+ WHICH I LOVE, BUT A PROBLEM HAS REARED ITS UGLY HEAD, WHEN I PLUG THE POWER SUPPLY INTO THE BACK OF MY SPECCY IF I DON'T HOLD IT DOWN WITH A WEIGHT, THEN IT WOBBLERS ABOUT AND THE PICTURE GOES HAYWIRE, I HAVE HAD A LOOK AT WHERE THE PSU PLUGS INTO THE SPECTRUM AND THE THING THAT IT PLUGS INTO IS FLOPPY LOOSE, I AM NOT VERY GOOD WITH A SOLDERING IRON, BUT AM A DAB HAND WITH SUPERGLUE, COULD I GET AWAY WITH SUPERGLUEING IT BACK DOWN, HENCE HOPEFULLY CURING THE WOBBLE.

BILLS ANSWER:

THE ONLY ANSWER TO YOUR PROBLEM CLAIRE IS TO GET SOMEONE TO SOLDER IT FOR YOU, AS THIS IS THE ONLY WAY TO CURE IT, AND DON'T ON ANY ACCOUNT USE SUPERGLUE, AS THIS WILL ONLY CAUSE YOU MORE PROBLEMS.

by Ken Beer

A Program having been entered into the Computer is lost as soon as it is switched off and therefore some permanent store is required. So the first thing I want to discuss this month is how we SAVE our programs. We do this on a cassette tape just as you would record a music tape but certain precautions are necessary

#### SAVEING A PROGRAM .

The first thing necessary is a good tape recorder to avoid the disappointment of false loadings. A stereo tape-recorder can be used but it is advisable to connect both left and right channels together. A recorder fitted with a counter will be found very useful, some would say essential.

Each program must be given a name and must not contain more than 10 characters. However, here is a useful tip. Often it is necessary to modify the original program and also keep several versions of the same program. If you use a maximum of 9 characters for the program name then you can use the remaining character as a version number.

The name must start and end in quote marks and be preceded by the Keyword SAVE thus : SAVE "name".

As I said earlier it is good practice to start each program with a REM statement. This should then be followed by the title. For clarity's sake it is not a bad idea to follow this with a blank line (although this is not essential). This is achieved by first entering the appropriate line number, then pressing the space-bar and finally the ENTER key. Another method is simply to use the line number followed by REM on its own and ENTERING normally.

When starting to record on a new tape always ensure that you are not attempting to do so on the leader tape which is usually coloured.

#### HOW TO SAVE

1. The Spectrum is connected to the tape-recorder via a twin lead with two jack plugs at each end. One connects the MIC socket of the Spectrum with the MIC socket (input) of the recorder.

The other lead connects the EAR socket of the Spectrum to the EAR socket (output) of the recorder.

Make sure that the jack plug is removed from the EAR socket of the Spectrum before starting to record.

2. With the MIC sockets connected, ENTER SAVE "name 1".  
The Spectrum will reply with the message " start tape, then press any key" Now press the RECORD button on your recorder and wait a few seconds, then press ENTER on the Spectrum.
3. The computer is now SAVEing the program and while it is doing so, coloured stripes of varying width will be displayed on the screen. Finally, when completed, the Computer will respond with the message " ✓ OK ".

4. Stop the recorder and rewind the tape to the beginning. Now, the Spectrum provides a facility which enables you to VERIFY i.e. check that the program has been correctly SAVED. Press CAPS SHIFT & SYMBOL SHIFT together and the extended mode "E" will be shown and then press key R (in extended mode this is VERIFY), and the message "VERIFY" will be displayed. Now, press PLAY on your recorder and the coloured stripes should now re-appear and finally if all is OK you will again get the "O OK" message. If for some reason an error occurs then the message "R Tape loading error" is displayed. Errors can occur for many different reasons- it could be a faulty tape, a faulty record head on the tape machine or could even be because you were trying to record on the tape leader rather than the ferrite tape.

#### LOADING A TAPE

If the OK message has been given you may now key "NEW" and the computer will be reset. Rewind the tape and replace EAR plug into the Spectrum EAR socket. Now, LOAD "name", ENTER and press PLAY on the recorder. The name of the program will appear on the screen and when loading is complete you will see the now familiar OK message. The computer will only load the named program and should you have any other programs on the tape it will ignore them. However, if you omit the name (i.e. LOAD " ") then the next program will be loaded.

#### MERGING

Normally, when a program is LOADED, any other program already in the computer's memory is erased. When erasure is not required e.g. it may be necessary to combine two separate programs. The MERGE (key CAPS SHIFT & SYMBOL SHIFT TOGETHER AND key T) function enable you to do this. This requirement is often required when using UTILITY type programs e.g. Line renumber and delete programs. When using the MERGE facility care must be taken to ensure that because the same line numbers happen to be used that you don't override the program you want to retain.

Now finally, I want to change the subject and talk about something completely different.

#### READ and DATA

Up to now we have been entering data at the keyboard in response to an INPUT command. Another way of getting data into the program is to store it in DATA statements within the program itself and to READ the items of data from these DATA statements. With the computer in "E" mode, READ is available on key A and DATA on key D. You can put the data statements anywhere in the program because the computer ignores them except when its doing a READ. However it is usual to put them at the end of the program or program segment.

Each time the computer comes to a READ statement it takes the next item of data from the DATA list and places it in the location specified in the READ statement. There MUST be the same number of DATA statements as there are READ statements. If this condition is not met then the "E Out of data" message will be displayed. If the data is in "String" form then it is necessary to enclose each one in quotation marks. Two examples are shown below. One is using Numerical DATA and the other string DATA:

Numeric Data

```
10 READ a
20 READ b
30 READ c
40 PRINT a
50 PRINT b
60 PRINT c
70 DATA 10,20,30
```

String Data

```
10 READ a$
20 READ b$
30 READ c$
40 PRINT a$
50 PRINT b$
60 PRINT c$
70 DATA "TOM","DICK","HARRY"
```

Numeric and string data can of course be mixed and the following is an example of this:

```
10 READ d$
20 PRINT "The date is ";d$
30 DATA "June 21 1994"
```

This is all for this month, see you in a couple of months time!



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\* HAS GOT TO THE POINT WHERE WE CANNOT MOVE IN OUR HOME, TO LIST  
\* IT ALL HERE WOULD FILL THE MAG SO LET ME JUST GIVE YOU A BRIEF  
\* IDEA OF WHAT I HAVE FOR SALE,  
\* MANY DIFFERENT SPECTRUMS,  
\* LOADS OF SPECTRUM SPARES IE, KEYBOARDS ETC ETC,  
\* INTERFACES GALORE OF ALL KINDS FAR TOO MANY TO LIST HERE,  
\* MICRODRIVES, CARTRIDGES, INTERFACE ONES ETC,  
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\* COVER TAPES ETC ETC,  
\* LOADS OF BOOKS MAGS ETC,  
\* LIGHT GUNS, JOYSTICKS, TAPERECORDERS, THE LIST GOES ON AND ON IN  
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\*\*\*\*\*

# GO FORTH

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PART SEVEN BY JOE BLIZARD

TO BEGIN THIS MONTH I WILL GIVE A FULLER EXPLANATION OF THE ' $\leftarrow$  BUILDS DOES  $\rightarrow$ ' DEFINING STRUCTURE THAN I GAVE IN PART 6. THIS SHOULD HELP MAKE THE CONTENTS OF THIS PART EASIER TO UNDERSTAND. PUT SIMPLY THE ' $\leftarrow$  BUILDS SECTION OF THE DEFINITION CONTAINS ALL THE ELEMENTS OF THAT 'WORDS' DEFINITION. THE ' $\rightarrow$  DOES' PART SPECIFIES WHAT ACTION WILL OCCUR WHEN THE 'WORD' IS USED. TO ILLUSTRATE THIS WE WILL LOOK IN MORE DETAIL AT OUR ARRAY CREATION DEFINITION. THIS AS YOU WILL RECALL WAS DEFINED AS: ARRAY  $\leftarrow$  BUILDS 0 DO 0 , LOOP DOES  $\rightarrow$  , WE THEN USED THIS TO CREATE AN ARRAY WITH THE NAME 'MONTHS' BY ENTERING 12 ARRAY MONTHS. IN THE ABOVE EXAMPLE THE ' $\leftarrow$  BUILDS' PART OF THE DEFINITION RESERVES SPACE FOR 12 ELEMENTS OF THE ARRAY, AND INITIALISES EACH ELEMENT TO 0. THE 'DOES  $\rightarrow$ ' PART SIMPLY PLACES THE ADDRESS OF THE ELEMENT YOU SPECIFY ON THE STACK. BEFORE CONTINUING I MUST CORRECT AN ERROR IN PART 6. TO ACCESS THE ABOVE ARRAY YOU WOULD ENTER MONTHS 2 + @ TO DISPLAY THE CONTENTS OF THE SECOND ELEMENT, NOT ARRAY 2 + @ AS I ERRONEOUSLY TYPED.

TO CREATE A DEFINITION WHICH SETS UP AN ARRAY AND ALSO CALCULATES THE ADDRESS OF ANY ELEMENT OF THAT ARRAY IS NOT AS DIFFICULT AS IT SOUNDS. IF WE REMEMBER THAT EACH ELEMENT OCCUPIES TWO BYTES OF MEMORY WE SIMPLY NEED TO ADD TWO TO EACH ELEMENT TO REACH THE NEXT. FIRSTLY WE NEED TO SET UP THE SIZE OF OUR ARRAY AND TO DO THIS WE DOUBLE THE NUMBER OF ELEMENTS WE REQUIRE TO CALCULATE THE NUMBER OF BYTES REQUIRED AND RESERVE THE NECESSARY MEMORY. SO OUR DEFINITION BEGINS : ARRAY  $\leftarrow$  BUILDS 2 \* ALLOT DOES  $\rightarrow$  WE NOW NEED TO DEFINE HOW TO ACCESS ANY REQUIRED ELEMENT WITHOUT HAVING TO CALCULATE IT'S POSITION FIRST. AS WE KNOW FROM OUR MONTHS ARRAY THE ADDRESS OF THE FIRST ELEMENT IS PLACED ON THE STACK BY ENTERING MONTHS AS A COMMAND. IF WE ENTER 10 MONTHS THERE ARE NOW TWO NUMBERS ON THE STACK 10 SOS AND THE ADDRESS OF THE FIRST ELEMENT TOS. THEREFORE TO ACCESS ELEMENT 10 DIRECTLY WE NEED TO SWAP THESE NUMBERS AND MULTIPLY THE 10 (NOW TOS) BY TWO, AND THEN ADD THE TWO NUMBERS. THIS WILL THEN LEAVE THE ADDRESS OF THE REQUIRED ELEMENT TOS TO BE ACCESSED BY '@' AND PRINTED IF WE WISH. OUR DEFINITION NOW BECOMES :

```
: ARRAY  $\leftarrow$  BUILDS 2 * ALLOT DOES  $\rightarrow$  SWAP 2 * + ;
```

IF WE NOW ENTER 12 ARRAY MONTHS WE WILL CREATE AN ARRAY OF 12 ELEMENTS ANY OF WHICH WE CAN ACCESS BY SIMPLY ENTERING ITS NUMBER THEREFORE IF ELEMENT NO.10 HOLDS THE NUMBER 6 WE CAN PRINT IT BY ENTERING 10 MONTHS @.

SIMILARLY ENTERING 4 10 MONTHS . WILL STORE THE NUMBER 4 IN THE TENTH ELEMENT.

AS IT STANDS BOTH THIS DEFINITION AND THE ONE FROM PART 6 CONTAIN A FUNDAMENTAL ERROR IN CONCEPTION, AS I AM SURE YOU REALISED WHEN YOU TRIED TO USE THEM. I GAVE THE INFORMATION TO ENABLE YOU TO WORK OUT FOR YOURSELVES WHAT THE PROBLEM IS IN THE LAST ISSUE. IF YOU REMEMBER I TOLD YOU THAT 1 2 ARRAY MONTHS CREATES AN ARRAY WITH ELEMENTS NUMBERED 0 TO 11.

\*\*\*\*\*  
R  
R  
R  
R  
R  
R  
R  
R  
R  
R  
R  
R  

# GO FORTH

  
R  
R  
R  
R  
R  
R  
R  
R  
R  
R  
R  
R  
R

CONTINUED

\*\*\*\*\*  
R  
R THEREFORE IF WE USE 10 MONTHS @ . WE WILL ACTUALLY BE ACCESSING R  
R ELEMENT NO.9 AND NOT 10 AS WE EXPECTED. THE BEST WAY TO OVERCOME R  
R THIS PROBLEM IS TO CREATE AN ARRAY WITH ONE ELEMENT MORE THAN YOU R  
R REQUIRE. TO SAVE US HAVING TO REMEMBER THIS EACH TIME WE DEFINE AN R  
R ARRAY WE CAN CONSTRUCT OUR DEFINITION TO DO IT FOR US. R  
R R

R  
R : ARRAY < BUILDS 1 + 2 \* ALLOT DOES > SWAP 2 \* + ; R  
R R

R THIS IS NOW OUR COMPLETED DEFINITION AND WILL FULFIL THE CRITERIA R  
R WE LAID DOWN FOR IT. IF WE DEEMED IT NECESSARY WE COULD EXTEND OUR R  
R DEFINITION TO SELF CHECK IF WE TRIED TO ACCESS AN ELEMENT WHICH R  
R DID NOT EXIST. SINCE THIS REQUIRES MORE ADVANCED TECHNIQUES USING R  
R CONDITIONAL OPERATORS WE WILL DEMONSTRATE THIS WHEN WE COVER R  
R THESE OPERATORS. IN USE THE ABOVE DEFINITION WILL ACTUALLY CREATE R  
R AN ARRAY WITH ONE ELEMENT MORE THAN WE SPECIFY. TO CREATE OUR R  
R MONTHS ARRAY WE ENTER 12 MONTHS ARRAY AS BEFORE AND CREATE AN R  
R ARRAY OF 13 ELEMENTS NUMBERED 0 TO 12 . IF WE PLACE NO DATA IN R  
R ELEMENT 0 WE HAVE A MORE NATURAL ARRAY WHERE 10 MONTHS . WILL R  
R ACCESS THE ELEMENT ACTUALLY NUMBERED 10 AND NOT 9 AS BEFORE, R  
R (ALTHOUGH STRICTLY SPEAKING THIS IS REALLY THE ELEVENTH ELEMENT). R  
R WHEN USING THIS METHOD WE MUST REMEMBER NOT TO USE MONTHS ON IT'S R  
R OWN, FOR TO DO SO WOULD ACCESS ELEMENT 0. R  
R R

R CREATING ARRAYS OF TWO OR MORE DIMENSIONS MAY BE A MORE DAUNTING R  
R PROCESS, BUT IS IN REALITY SIMPLY AN EXTENSION OF THE ABOVE. R  
R ALTHOUGH A TWO DIMENSIONAL ARRAY IS CONCEIVED AS A MATRIX OF R  
R INTER CONNECTING ROWS AND COLUMNS, THEY ARE ACTUALLY STORED IN R  
R THE COMPUTER AS CONSECUTIVE BYTES. TO ILLUSTRATE THIS IMAGINE THAT R  
R WE HAVE CREATED AN ARRAY WITH 2 ROWS AND 3 COLUMNS. THESE WOULD BE R  
R STORED AS :- (0,0) (0,1) (0,2) (0,3) (1,0) (1,1) (1,2) (1,3). R  
R REMEMBERING THAT WE NEED ONE EXTRA COLUMN AND ONE EXTRA ROW TO R  
R PREVENT OUR PREVIOUS PROBLEM WITH ONE DIMENSIONAL ARRAYS OUR R  
R DEFINITION CALCULATES THE NUMBER OF BYTES NEEDED TO STORE THE R  
R ARRAY BY THE FORMULA 2 \* (REQUIRED ROWS +1)\*(REQUIRED COLUMNS +1). R  
R WE WILL DEFINE OUR MULTI-DIMENSIONAL ARRAY AS THE 'WORD' 'MARRAY'. R  
R TO CREATE THE ARRAY OF 2 ROWS AND 3 COLUMNS WE USE 'ALLOT' AGAIN R  
R TO RESERVE THE SPACE. R  
R R

R  
R : MARRAY < BUILDS 1 + DUP , SWAP 1 + \* 2 \* ALLOT; R  
R R

R REMEMBER WHEN YOU USE 'MARRAY' TO PUT THE ROW NUMBER ON THE STACK R  
R BEFORE THE COLUMN NUMBER. THUS TO CREATE OUR REQUIRED ARRAY WE R  
R WOULD ENTER 2 3 MARRAY IT'S THAT EASY. WE MUST NOW ENTER THE R  
R DOES > PARAMETERS TO COMPLETE OUR DEFINITION SO THAT WE CAN R  
R ACCESS ANY ELEMENT. R  
R R

R THE FORMULA USED TO CALCULATE THE POSITION OF ANY ELEMENT WITHIN R  
R THE ARRAY IS :((REQUIRED ROW) \* (TOTAL NUMBER OF COLUMNS)) + R  
R REQUIRED COLUMN. TO UNDERSTAND THE DEFINITION IT IS NECESSARY TO R  
R KNOW THE WAY IN WHICH FORTH STORES THE ARRAY IN MORE DETAIL. R  
R R

\*\*\*\*\*

# GO FORTH

CONTINUED

THE ACTUAL ELEMENTS OF ANY ARRAY ARE STORED IN WHAT IS KNOWN AS THE PARAMETER FIELD. THE FIRST TWO BYTES OF THIS FIELD ARE USED TO STORE THE TOTAL NUMBER OF COLUMNS THE ARRAY HAS BEEN CREATED TO HOLD. THEREFORE IF WE CREATE AN ARRAY OF 3 COLUMNS AND 2 ROWS THESE FIRST TWO BYTES WILL HOLD THE NUMBER 3. YOU WILL HAVE NOTICED IN OUR 'MARRAY' DEFINITION THE NEW 'WORD' ','. THIS REMOVES A VALUE FROM THE STACK (IN THIS CASE THE NUMBER OF COLUMNS) AND PLACES IT IN THE PARAMETER FIELD OF THE ARRAY. TO ACCESS THE LAST ELEMENT OF OUR ARRAY WE WOULD ENTER 2 3 MARRAY WHICH WOULD INITIALLY LOAD THE STACK WITH TOS BASE ADDRESS 3 2. OUR FIRST STEP IS TO BRING THE NUMBER OF ROWS TOS, THEN DUPLICATE THE ADDRESS TO TOS AND FETCH ITS CONTENTS (TOTAL NUMBER OF COLUMNS) AND MULTIPLY THIS WITH THE NUMBER OF ROWS.

THEREFORE WE START DOES > ROT OVER @ \* WHICH LEAVES THE STACK TOS @ ADDRESS 3. WE NOW NEED REQUIRED COLUMNS TOS SO WE 'ROT' AGAIN AND ADD . WE THEN DOUBLE IT TO GET THE NUMBER OF BYTES (2 PER ELEMENT) AND ADD THIS TO THE BASE ADDRESS. WE MUST THEN ADD 2 TO ALLOW FOR THE TWO BYTES HOLDING THE TOTAL NUMBER OF COLUMNS IN THE PARAMETER FIELD. OUR FINAL DEFINITION BECOMES:-

```
: MARRAY <BUILDS 1 + DUP , SWAP 1 + * 2 * ALLOT  
DOES > ROT OVER @ * ROT + 2 * + 2 + ;
```

WE WILL END THERE FOR THIS MONTH AS THIS IS ENOUGH TO ASSIMILATE FOR NOW. THE BEST WAY TO UNDERSTAND THESE DEFINITIONS IS TO FOLLOW THE STACK CHANGES ON A PIECE OF PAPER. NEXT TIME WE LOOK AT TEXT HANDLING AND KEYBOARD INPUT/DETECTION. UNTIL THEN PRACTICE CREATING ARRAYS AND PUTTING/RETRIEVING DATA.

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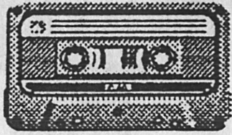
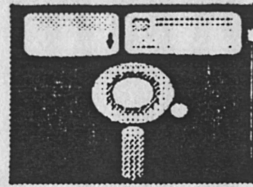
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# PD



# REVIEW.

BY RICHARD  
COLES

Hello fans and welcome to another PD REVIEW. Mr. Great mate himself,

Roy has said that I can have TWO pages! Good Eh'? As you can see, I have made a change this month. I've dumped the Acorn that this was done on last month to do it on my Speccy!

I know that its not so good as the Acorn, but I like it! (We all do, otherwise we wouldnt read Speccy U.K!) Well, my wordprocessor is better to use than the Acorn. After making this decision, my Speccy bit the dust, so this is typed on a BBC.

Both of these computers are not mine, but are owned by my Science teacher, Paul Richards. Thanks Paul. Next we come to my column this month.

Because of the state of my poor ole Speccy, I couldnt do any reviewing this month. But dont worry! instead

I am going to write about "What is PD?". So, with out any more fuss, I

will start. PD, well the first and most relevant thing is that its free. This is not always true. Some PD you have to pay for! This is called shareware. In my book, shareware is not real PD. It only holds the the title because there is no copyright on it, so you can freely copy! The reason for me not liking this is because you could pay £5 for a game, and when you get it in the post, its rubbish! If its free like real PD and you get it you get it in the post its rubbish then so what? All you have lost is a couple of stamps! Also, with PD, you can get older programs very cheap, or at no cost at all!

Right, this month I am setting you a little compo. If you are new to PD or would just like to have go, then send me your bits and bobs. The winner will get a game and a review. Also, you MUST be letting it out or even giving it to a PD libary, but tell me where I could get it. PD libarys can join in to! Whaat ever you are planning to do, my address is RICHARD COLES, 7 MANOR DRIVE, MERRIOTT, SOMERSET, TA16 5NT. Have a go, and good luck! See you next month!

# BACK TO THE +3

## CHRISTMAS FUTURE?

Merry Christmas to all!, Back To The +3 has a distinctly festive air this month as we delve into such deep questions as will ITV screen a bond film just when your tucking into the Christmas dinner?

Seriously though this month I thought I would take a look at what's happening out in the computer world in general this Christmas.

This seems to be the Christmas that the IBM compatible has become a consumer product. The TV is full of Microsoft and Compact commercials, IBM is advertising it's OS/2 WARP operating system and the PC world in general awaits Windows 95 from Microsoft.

Most New machines seem to have a CD-ROM drive and Prices of 486 and Pentium hardware are falling fast. The first "affordable" Virtual Reality Headset has appeared for around £499 +Vat, just plug it into your PC and play.

I think the consoles are in for a shock at the number of real computers that will take a large slice of the games market.

I tried out a Atari Jaguar last week this is a 64bit console, and the game running was Wolfenstein 3D one of my favourite PC games. However the graphics and scrolling were not even up to my VGA 12MHz 286 PC

(a 16bit machine). I was not alone in my assessment as another guy remarked that compared with his high spec 386 the Jaguar version was SAD, this may have been down the hardware being new and that the programers may not have been familiar with it yet. But this program was being used to sell you the console, bad move when next door in the shop were CD-ROM equipped high spec PC's running Doom one of the latest offerings from ID software who also wrote Wolf 3D.





# BACK TO THE +3

## **SPECTRUM ON MAC**

Good news for any Spectrum fans out there who also own a Apple Mac as a couple of Spectrum emulators are now available. Unfortunately I do not know who has written them or where you can acquire copies, so if anyone knows please drop me a line and I will put it in the next section.

## **CHRISTMAS COMES EARLY**

I had some luck at the local market a few weeks back, I acquired some interesting brand new Spectrum software. The stall holder also owns a shop in a nearby village, and one Saturday morning a guy walked in and asked if he was interested in some old computer gear.

The guy had once owned a computer shop and had a loft full of old stock, he was getting married the next weekend and his fiancée was not having all that "old junk" in their new house. So he was in a bit of a deft stick.

The stall holder, a friend of mine and big Amiga fan looked at the mountain of gear that had appeared on the pavement outside his premises. And made a offer as the stuff was alternatively going to the tip, he made a offer of 25 quid the lot. Not

having much choice and not wanting to load it back into his car the guy accepted.

This hoard included monitors, large dot-matrix printers, several boxed ZX 81's, Ram paks 16K, 32K, 64K, boxed ZX Spectrum +, 25 different interfaces for ZX 81 and Spectrum, a couple of early Apple computers, disk drives etc., around 20 books ranging from ZX 80 to Atari, Keyboard covers for ZX 81 and Spectrum 16/48K, a crate of software for ZX 80/81 Spectrum, Apple, Atari and BBC, and several early computers mint and boxed and goodness knows what else.

I bought a machine code Monitor and assembler by Picturesque and Logic 3's Learn Basic Programming on the Sinclair ZX Spectrum. I also bought ZX Spectrum Chess by Pison on ROM cartridge, though I don't have the interface, I haven't seen a lot of ROM software and added it to my collection. From his initial £25 Phillip made £300+ and he was selling it dirt cheap so that shows how much gear he had.

A once in a lifetime find as Phillip put it.

I wish all members of SPECTRUM U.K. a very merry Christmas and a happy new year.

*Nick Mansford*



# CODE CRUNCHER

John Blackburn

Shannas Schoolhouse,  
Clola,  
Mintlaw,  
Aberdeenshire AB42 8AE.

Happy new year Code Crunchers. Gosh it seems like a long time since I last guided your programming. The December issue was actually written way back in July! Since then lots of things have happened. For a start there was that ridiculous charade of Christmas to cope with once more. Bah humbug! Who could believe that a fat old man flies around the world in a ridiculous outfit. Excuse me, this multicoloured cape seems to have shrunk in the wash...

That's better, this dressing gown is much more comfortable. Funny thing is I now have trouble squeezing through doorways, they must have shrunk too. Damn! There goes another chair!

The other thing is the national Lottery. Code cruncher would never be foolish enough to enter this 'tax on idiots' but its interesting to calculate the probability of winning. I found out that the probability of getting exactly N numbers right is given by:

$$P = \frac{1}{(37+N)!49!N!} \left[ \frac{43!6!}{(6-N)!} \right]^2$$

! means factorial e.g. 5!=5x4x3x2x1=120. Note that 0!=1 (by definition).

These probabilities are written in the standard form as numbers between 0 and 1. 0=impossible 1=certainty. You can convert to percentages by multiplying by 100. If you want the odds in the form 1 in x, then x=1/P. If you really want racing odds of then express P as a fraction:

a/b and odds are (b-a) to a against. E.g. 4/10 = 6 to 4 against.

We get

N	P
0	0.436
1	0.413
2	0.132
3	0.018
4	9.69e-4
5	1.84e-5
6	7.15e-8

1/7.15e-8 is about 1 in 14,000,000.

If this probability is p and n people enter the lottery then the chance of at least one of them winning the jackpot is:

$$P = 1 - (1 - p)^n$$

and the chance of them all winning is:

$$P = p^N$$

I also calculated the probability of a group of N people containing at least two people with the same birthday.

$$P = 1 - \frac{365!}{(365 - N)!365^N}$$

# CODE CRUNCHER

And a group of 23 people has a probability 0.5 (50%, 1 in 2, 1 to 1) of having a duplicate birthday!

A lot of nonsense is talked about probabilities. For instance various newspapers are tabulating the lottery balls. If a ball has come up many times, they suggest that it probably wont turn up again for some time. In fact there is no mechanism by which the lottery numbers can remember what they previously were last week. Each ball is just as likely to turn up every week. If you throw a die and get a 6 the probability of you getting another 6 on the next throw is still  $1/6$ .

The die does not remember what it previously was.

The only way to ensure victory in the lottery is not to play and instead invest the saved money. That way you can gain wealth from expanding businesses and not from idiots buying lottery tickets. Its a myth to suggest that money can be made without hard work (or at least somebody else's hard work). Now don't you feel ashamed of yourself?

I also wanted to tell you a bit about Maple. This is a software package which can do symbolic maths. It is quite happy to use variables in the abstract, manipulating these algebraically just like a human mathematician.

It can handle expressions in any number of variables. For instance simplifying factorising, writing as partial fractions, using trig identities etc. Maple can integrate and differentiate a wide variety of functions. (more than I can)

It can solve equations and simultaneous equations as well as differential equations and simultaneous differential equations. The solution need not be simply a number (or a series of numbers in the case of differential equations) but can be an algebraic function of any number of variables (it is necessary to define the unknowns and the dependant and independent variables in the case of differential equations).

Maple can handle vectors and matrices (it has dozens of functions associated with matrices alone, most of which I have never heard of) as well as complex numbers. You can also plot graphs of functions in 2D or 3D in a wide variety of forms.

Maple has its own version of BASIC in which you can do the normal commands as well as invoking maples powerful symbolic maths facilities. I wrote a program to analyse an arbitrary electronic circuit. Maple sets up a series of simultaneous equations and solves them.

The variables of Maple are very sophisticated. You can set a variable equal to a number, a function, an equation, a set, sequence, list, vector, or matrix. Sets etc can be nested and each element can contain any of the above structures!

Maple also apparently has numerical analysis capabilities. But I found these are very slow and memory wasteful. The fact is that Maple is too clever by half when it comes to simple number crunching. (I think it tries to do everything symbolically). I asked it to solve three simultaneous differential equations numerically and after several minutes it failed having used up the entire memory. (10Mb). Asked to do the same task the spectrum succeeded slowly but surely.

Also some of the functions contain bugs. Maple simply cannot do what it says in some parts of the manual. I also found that the commands were difficult to learn, each having a different (sometimes obscure) syntax. Many of the commands could have been condensed into one.

Anyway thats enough gossip, on to this months program which is a SIRDS generator. A SIRDS is a Single Image Random Dot Stereogram also known as the Magic Eye™. I'm sure you have seen these. They consist of a pattern of random dots which if you stare at it for long enough will destroy your eyesight. The only compensation is a rather poor quality monochrome image.

The reason we see in 3D is because we get a slightly different image from each eye. If the object is close to us, the images will be very different and if it is far away they will be very similar. 3D glasses exploit this forcing one eye to see the red image and one to see the shifted green image. Since these two images are substantially shifted with respect to each other, the brain assumes that they are closer than the page. (Images from the page will also be shifted but not as much.)

Generating a SIRDS is quite simple. You take a rectangle consisting of random pixels and duplicate it. In the following program I have used a 10 x 10 attribute cell rectangle

# CODE CRUNCHER

(80 x 80 pixels). You then cut out the shape you want to 'appear before your eyes' from one of these random blocks and move it to the right. If you want an apple, for instance you cut out an apple shaped pattern of random dots and move it to the right. If you were doing this on paper, you would take a stencil of an apple and draw round it. You could then cut out the apple shaped random dot pattern.

You then fill the hole left behind by the apple with more random dots. This is a slightly unrewarding exercise as the result is just as random as before. However when you print this doctored random pattern beside the original unadulterated pattern you have a sirds.

The idea is to make your left eye look at the left pattern and your right to look at the right pattern. Your brain detects that of the two images from your two eyes (Cyclopes will struggle in vain to see a sirds) one has an apple shaped chunk shifted with respect to the other. So the brain assumes that this apple is closer than the background which is the same in the images from both eyes!

The following program first of all pulls the shape you want off the screen. You must draw it in the top left of the screen in a 80 x 80 rectangle. It should be a fairly simple shape in black and white only. Don't bother with any fancy cross hatching or anything.

The program actually generates two 'random' blocks (rand1 and rand2) and duplicates rand1. These numbers are simply taken from the ROM and might not be very random at all. You could poke random numbers into the appropriate memory locations if you like.

Note that memory blocks are defined using DEFS 800,0 which means inserts 800 zeros at this point. The first byte will be labelled.

The program initially grabs the shape from the appropriate part of the screen.

First of all it gets the shape from rand1 and stores it in shpran1. It gets the shape from rand2 and stores it in shpran2. These do not alter rand1 or rand2. The program does this by ANDing the shape with rand1 and storing the result in shpran1. Wherever there is a 1 in shape the result is the corresponding bit from rand1. Where there is a zero the result *must* be zero.

We could use OR in a similar way getting rand1 for a zero in shape and 1 for a 1 in shape. We would then get our shape surrounded by random dots from rand1.

Finally we could use XOR to get rand1 showing through for 0 in shape and the opposite of rand1 for 1 in shape.

You might not think that such esoteric sounding functions as AND and OR would be just what we need to cut out shapes, but now you know better! Of course what we are really doing is comparing patterns using AND and OR.

The program now inverts the shape making 1=0 and 0=1.

It then cuts the shape out of rand1 leaving zeros in its place and replaces this gap with the shape from rand2 (shpran2). This is all to leave random dots in the gap left behind when we move the shape.

The computer then scrolls the shape and shpran1 right. It again cuts the shape out of rand1 leaving zeros and shoves in shpran1 (remember shpran1 and shape have just been scrolled).

The effect is as desired, shape has been shifted right and the gap replaced with some of the random bits in rand2.

All that remains is to print the doctored rand1 on screen next to the unaltered duplicate (dupl). Phew!

The logic operations here are also used extensively in sprite manipulation. All sprites are stored twice, the actual bitmap and a mask or matte, being the inverse of the shape of the sprite. AND is used to insert a sprite shaped pattern of 0s in the background and OR is used to insert the sprite into the background.

```
org 30000 ← JP START
screen equ 16384
size def 800 SIZE EQU 800
shape defs 800,0
rand1 defs 800,0
dupl defs 800,0
rand2 defs 800,0
```

# CODE CAUNCHER

```
shpran1 defs 800,0
shpran2 defs 800,0
```

```
START ld hl,0 ;get 'random' numbers for rand1
ld de,rand1
ld bc,size
ldir

ld de,rand2 ;get random rand2
ld bc,size
ldir

ld hl,rand1 ;duplicate rand1
ld de,dupl
ld bc,size
ldir

ld hl,screen ;pull shape off screen
ld de,shape
ld b,80
ld c,10
spt1 push bc
push de
ld b,0
ldir
pop de
pop bc
call dwn1
djnz spt1

ld hl,shape ;get shape from rand1 and place it in shpran1
ld ix,rand1
ld bc,size
ld de,shpran1
lps1 push bc
ld a,(hl)
ld b,(ix)
and b
ld (de),a
inc de
inc ix
inc hl
pop bc
dec bc
ld a,b
or c
jrnz lps1

ld hl,shape ;get shape from rand2 and place it in shpran2
ld ix,rand2
ld bc,size
ld de,shpran2
lps2 push bc
ld a,(hl)
ld b,(ix)
and b
ld (de),a
inc de
inc ix
inc hl
```

# CODE CRUNCHER

```
    pop bc
    dec bc
    ld a,b
    or c
jmz lps2

ld bc,size          ;invert shape
ld hl,shape
mask ld a,(hl)
    cpl
    ld (hl),a
    dec bc
    ld a,b
    or c
jrnz mask

ld hl,shape        ;cut out shape from rand1
ld ix,rand1
ld bc,size
cut1 ld a,(hl)
    ld d,(ix)
    and d
    ld (ix),a
    inc ix
    inc hl
    dec bc
    ld a,b
    or c
jmz cut1

ld hl,shpran2     ;insert shpran2 into hole in rand1
ld ix,rand1
ld bc,size
put1 ld a,(hl)
    ld d,(ix)
    or d
    ld(ix),a
    inc hl
    inc ix
    dec bc
    ld a,b
    or c
jrnz put1

ld de,rand1-1    ;scroll shape right
ld hl,rand1-2
ld bc,size
laddr

ld de,shpran2-1 ;scroll shpran1 right
ld hl,shpran2-2
ld bc,size
laddr

ld hl,shape      ;cut out shape(scrolled right) from rand1
ld ix,rand1
ld bc,size
cut2 ld a,(hl)
    ld d,(ix)
    and d
```

# CODE CAUNCHER

```
ld (ix),a
inc ix
inc hl
dec bc
ld a,b
or c
jrnz cut2

ld hl,shpran1      ;insert shpran1 into rand1
ld ix,rand1
ld bc,size
put2 ld a,(hl)
      ld d,(ix)
      or d
      ld (ix),a
      inc ix
      inc hl
      dec bc
      ld a,b
      or c
jrnz put2

ld hl,rand1      ;put rand1 on screen
ld de,screen
ld b,80
ld c,10
spt2 push bc
      push de
      ld b,0
      ldir
      pop de
      pop bc
      call dwn2
djnz spt2

ld hl,dupl      ;put dupl on screen
ld de,screen+10
ld b,80
ld c,10
spt3 push bc
      push de
      ld b,0
      ldir
      pop de
      pop bc
      call dwn2
djnz spt3

ret

dwn1 inc h
      ld a,h
      and 7
      ret nz
      ld a,h
      sub 8
      ld h,a
      ld a,l
      add a,32
      ld l,a
```

# CODE CRUNCHER

```
ret nc
ld a,h
add a,8
ld h,a
ret

dwn2 inc d
ld a,d
and 7
ret nz
ld a,d
sub 8
ld d,a
ld a,e
add a,32
ld e,a
ret nc
ld a,d
add a,8
ld d,a
ret
```

Simply randomize usr 30000 and the SIRDS will be printed on screen.

SIRDS were invented in the 70s as an example of how the brain interprets information. It was thought that the brain first identifies objects from its 2 2d images (cars, houses, food etc..) and then identifies their relative distances from how much they are shifted.

However the brains ability to sort random patterns into distance order, shows that distance sorting happens first before any attempt is made to identify objects. So there! I first read about them in a book several years ago.

SIRDS were never thought of as anything more than a mildly entertaining optical illusion. (There are many better ones) and lapsed into obscurity until last year when someone decided that they were a marketing opportunity and the rest is history.

Another tax on idiots if you ask me, but the same could be said for most films books and TV. In fact idiots pay more tax voluntarily than through taxation yet still complain about tax. By far the most punitive tax on idiots is console games, of course.

Its a funny old world, n'est-pas. Mai, c'est la vie mon petit soup de jour. write (1,fmt='(4f12.5,7i1)' ) a,b,c,d (damn, wrong language!)

There's a probability of 1 (100%, 1 in 1, 0 to 1 against) that I'll see you next month, Code cruncher cadets!

Bye for now!



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ZINNERMAN'S

ZEST

'HELLO ZINNERMAN HERE...ONCE AGAIN' REVIEHING MORE GAMES, DATING HAY BACK IN THE DAYS OF HAPPINESS AND HEALTH.

SOME THINGS YOU HAVE HAD SOME THINGS YOU WISHED YOU HAD AND SOME THINGS YOU ARE GLAD YOU NEVER HAD!!

A little different type of game this month, simple but most addictive and enjoyable.

ADVANCED PINBALL SIMULATION a budget priced game by CODE MASTERS

and wrote by 'THE OLIVER TWINS'

CODE MASTERS was one of the few successful budget software houses AND VANCE D PINBALL SIMULATION was one of many of their releases to hit the



shops around the Year of 1987

When visiting the sea side the first machine to be occupied by me in the arcades is the pinball. I usually spend the full fortnight, battling for extra points, free ball, free game due to the high score. ADVANCED PINBALL SIMULATION is

no different to this with all the features of the real machines. The differences however is that you can't shake the machine and you can't tilt it either.



SPECTRUM 48K/128K

Pinball Simulator



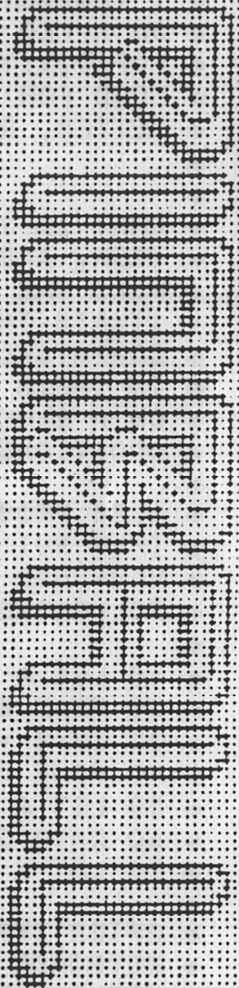
RELEASE BY THE BESTSELLING OLIVER TWINS

PLAY BALL

PLAY BALL

PLAY BALL

# REVIEWED



Some of the targets will destroy the 'EVIL WIZARD'S CASTLE.'

Rolling over the letters in the lanes to earn the bonus points you desire, and by lighting up the word 'MAGIC' to get the spell book, and once again so that you are able to open the book.

Rolling over the letters L & R will open the trap door and again to close them.

A free ball is awarded for every 10,000 points scored.

This game will take up to three players, is very

enjoyable and will keep you up in the wee early hours.

The controls are simple and a must with the keyboard, although the option for joystick is not apparent, (bit obvious really eh)!

## REVIEWED

ZIM SEZ

I enjoyed this very much and got into a state of frustration of missing certain bonus's as I had to go to the toilet.

I played all night

## REVIEWED

...is to knock down all the targets to light up the special features scattered about the table.  
You will be looking for a 'BUBBLING WEATHER POTION and a MAGIC COTTAGE.'

## REVIEWED

THE KEY'S ARE:-

Z- for the left flipper's

H- for the right flipper's

P- pause/restart during game

G- to quit player on the table

O & S- to quit all players

SPACE- to pull back the spring

and info day break as did the rest of the family too.

This is well laid out, simple to understand and play. I am proud to say that I was successful in obtaining a good high score.....SO LONG

KEEP  
MAGELINE  
AND  
WHEELS

# REVIEWED



## REVIEWED

Well that's it until next month when I shall review another favourite game of days gone past, unless there are any new ones that we have not yet seen, or any games that you have wrote perhaps? LET ME KNOW?

UNTIL NEXT MONTH

ZINNERMAN



# BACK IN TIME...

WITH ARNOLD YATES

I THOUGHT FOR OUR STROLL BACK IN TIME IN THIS ISSUE I WOULD PASS ON A FEW SNIPPITS OF INFORMATION AS REGARDS THE OLD SPECTRUM THAT HOPEFULLY WILL BE OF USE AND INTEREST TO YOU, AND MAYBE GIVE YOU FOOD FOR THOUGHT OF OTHER WAYS TO CHANGE THE SPECTRUM FOR THE BETTER, RIGHT LETS CRACK ON AND GET STARTED.

WHAT IS THE DIFFERENCE BETWEEN THE +2 GREY 128K AND THE +2A BLACK 128K, AND WHY WERE THERE SO MANY INCOMPATIBILITY PROBLEMS...? WELL THE +2 GREY IS REALLY THE OLD STYLE SINCLAIR BLACK 128K, (THATS THE ONE WITH THE HEAT SINK ON THE SIDE), THIS WAS THE MOST COMPATIBLE OF ALL THE SPECTRUMS, THE PROBLEMS STARTED WHEN AMSTRAD IN THEIR WISDOM REWROTE PART OF THE ROM, PROGRAMMERS USED TO RELY ON A BLOCK OF MEMORY THAT ALWAYS CONTAINED 255, HENCE AMSTRADS ADDITIONS TO THE ROM RESULTED IN SOME PRETTY SPECTACULAR CRASHES.

ALSO PROGRAMMERS NOW HAD TO BE CAREFUL WITH WHAT KIND OF CODE THEY PUT BELOW 32768 IN MEMORY, OTHERWISE THE RESULT WOULD BE VERY BAD SCREEN CORRUPTION, TO SEE WHAT IS MEANT BY THIS TRY THE FOLLOWING PROGRAM.

```
10 LET A = 32768
20 READ B
30 IF B = 999 THEN GOTO 70
40 POKE A,B
50 LET A = A+1
60 DATA 243, 62, 64, 237, 71, 251, 201, 999
70 LET K =USR 32763: LIST: LIST: LIST
```

AFTER TYPING IN THE ABOVE PROGRAM WHAT YOU WILL FIND IS THAT THE KEYBOARD WILL COMPLETELY LOCK UP AND NO MATTER WHAT KEY YOU PRESS NOTHING WILL HAPPEN. THE ONLY THING THAT YOU CAN DO IS PRESS THE RESET BUTTON TO CLEAR OUT THE PROGRAM.

NOW THIS INFORMATION IS FOR ANYONE WHO WOULD LIKE TO OWN THE BEST OF SPECTRUMS, FIRST GET HOLD OF ONE OF THE OLD BLACK 128K SPECCYS (THATS THE ONE WITH THE HEAVY HEAT SINK ON THE SIDE), OPEN IT UP AND CAREFULLY REMOVE THE ROM CHIP, THEN PUT THE CHIP INTO YOUR +2 GREY, YOU NOW HAVE THE BEST SPECTRUM GOING, AND ALSO YOU WILL HAVE THE ADDED BONUS OF THE TAPE TESTER WHICH IS REALLY USEFUL TO ADJUST THE BUILT IN TAPE RECORDER ON THE +2, HENCE TAPE LOADING ERRORS WILL BECOME A THING OF THE PAST, I MUST STRESS HOWEVER DON'T TRY THE ABOVE ON THE +2A OR THE +2B AS THERE IS A DIFFERENCE IN THE CIRCUIT BOARDS, BELIEVE ME I HAVE TRIED IT, AND IT JUST WON'T WORK.

IF ANY MEMBERS HAVE ANY SIMILAR TIPS FOR ALTERING SPECTRUMS FOR THE BETTER, THEN DO WRITE IN AND SHARE THEM WITH OTHER MEMBERS, PLEASE SEND YOUR LETTERS TO ARNOLD YATES C/O SPECTRUM U.K. USUAL ADDRESS. THANK YOU.

\*\*\*\*\*  
\* **BACK IN TIME...** \*  
\* WITH ARNOLD YATES \*  
\*\*\*\*\*

\* THE FOLLOWING IS FOR ALL THE MEMBERS WHO OWN A +2A, +2B, OR +3, \*  
\* THESE SPECTRUMS CONTAIN A BUILT IN TEST PROGRAM, IF YOU WOULD \*  
\* LIKE TO CALL IT UP THEN JUST FOLLOW THE INSTRUCTIONS PRINTED \*  
\* BELOW, THOUGH A WORD OF WARNING BEFORE WE BEGIN, DON'T LEAVE A \*  
\* DISC IN THE DRIVE WITH ANYTHING ON IT THAT YOU DON'T WANT TO LOSE \*  
\* AS THE TEST PROGRAM WILL CORRUPT IT, THAT SAID THEN OFF WE GO. \*

\* FIRST HOLD DOWN THE RESET BUTTON AND AT THE SAME TIME HOLD DOWN \*  
\* THE BREAK KEY, NEXT LET THE RESET BUTTON GO SO THAT THE TEST CARD \*  
\* APPEARS, NOW WITH YOUR LEFT HAND HOLD DOWN THE KEYS Q,A,Z, AT THE \*  
\* SAME TIME PRESS DOWN WITH YOUR RIGHT HAND THE KEYS P,L,M, THE \*  
\* TEST PROGRAM WILL NOW APPEAR. \*

\* TO USE THE SOUND TO LIGHT PROGRAM HOLD DOWN THE KEYS E,A,U, AT \*  
\* THE SAME TIME WHEN THE TEST CARD IS DISPLAYED, NOW JUST PLAY A \*  
\* MUSIC TAPE IN YOUR TAPE DECK AND SIT BACK AND RELAX, TO RETURN \*  
\* FROM TEST CARD TO MAIN MENU HOLD DOWN KEYS V AND B. \*

\* NOW LASTLY A PROGRAM FOR EVERYONE WHO OWNS POWERPRINT AND WOULD \*  
\* LIKE TO TRANSFER IT TO CARTRIDGE OR DISC DRIVE, AND ALSO MAKE IT \*  
\* POSSIBLE TO PRINT OUT THE RESULTS ON THE CITIZEN 120D PRINTER OR \*  
\* THE HR 5. \*

- \* 1...SWITCH ON THE COMPUTER AND LOAD YOUR DOS AS NORMAL. \*
- \* 2...PUT A FORMATED CARTRIDGE OR DISC WITH DOS ON IT IN THE DRIVE. \*
- \* 3...TYPE IN THE FOLLOWING PROGRAM USING KEY WORDS. \*

```
* 10 CLEAR 30664 :LOAD *"M" ;1; "M" CODE :LOAD * "M" ;1;"B" ENTER *  
* NOW SAVE THIS ON TO CARTRIDGE OR DISC WITH, *  
* SAVE *"M";1;" POWERPRINT" LINE 10 ENTER. *
```

-----  
\* NOW LOAD THE POWERPRINT TAPE AS NORMAL,WHEN IT IS LOADED press \*  
\* BREAK,NOW TYPE 2120 PRESS ENTER,THIS WILL CLEAR LINE 2120 OUT. \*

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* NOW TYPE IN THE FOLLOWING LINE WITH KEY WORDS. *  
* 2120 if i$ = "H" THEN INPUT ; : SAVE SCREEN$ 1: GO TO s ENTER *
```

\* NOW TYPE IN THE FOLLOWING. \*  
\* SAVE \*"M";1;"M"CODE.30665,11832: SAVE \*"M";1;"B" LINE 99 ENTER \*  
\* THIS WILL NOW SAVE TO CARTRIDGE OR DISC. \*  
\* TO LOAD THE PROGRAM FROM HERE TYPE IN GO TO 99,THE PROGRAM WILL \*  
\* LOAD READY TO USE,OR RESET COMPUTER AND RELOAD THE PROGRAM. \*  
\* IF THE PROGRAM WONT PRINT OUT RESET COMPUTER AND TYPE IN POKE @ \*  
\* 6,1 ENTER,THEN RELOAD THE PROGRAM,IT SHOULD NOW BE OK. \*

\* WELL THATS ABOUT IT FOR THIS BACK IN TIME FOLKS I HOPE THAT YOU \*  
\* HAVE ENJOYED IT, REMEMBER IF THERE IS ANY SPECIFIC SPECTRUM ITEM \*  
\* THAT YOU WOULD LIKE ME TO WRITE ABOUT THEN JUST DROP ME A LINE TO \*  
\* ARNOLD YATES C/O SPECTRUM U.K. THE USUAL ADDRESS. THANK YOU. \*

WRITEBACK



NIGEL FROM HULL WRITES:
MANY THANKS FOR ISSUE ELEVEN OF SPECTRUM UK
IT'S ABSOLUTELY BRILLIANT, KEEP UP THE GOOD WORK. UNFORTUNATELY I HAVE TO DRAW YOUR ATTENTION TO A COUPLE OF POINTS NAMELY:
THE PRICE PAID FOR POSTING SPECTRUM UK.
I GOT A CARD FROM THE POST OFFICE ON THE 23RD DECEMBER STATING THAT THERE WAS A LETTER FOR ME AT ONE OF THEIR SORTING OFFICES WHICH HAD THE INCORRECT POSTAGE ON IT.WHEN I WENT TO PICK IT UP THERE WAS FOUR PENCE OWING FOR POSTAGE PLUS 15 PENCE SURCHARGE. THIS HAS HAPPENED BEFORE EXCEPT THE POSTMAN HAS DELIVERED IT NOT BOTHERING WITH THE POSTAGE. I'M NOT BOTHERED ABOUT GETTING A REFUND OR EVEN IF YOU HAVE TO PUT UP THE SUBSCRIPTION..
HANG ON A SECOND YOU JUST HAVE, IT DOES'NT MATTER JUST AS LONG AS THE CORRECT POSTAGE IS ON PLEASE PLEASE PLEASE.
NOW THE SECOND POINT: THE TRANSFORMATION TO A4.
WHAT HAPPENED A?, WHERE IS IT ?, ACCORDING TO JULY'S EDITORIAL IN THE LAST PARAGRAPH THIS WAS GOING TO BE THE FIRST ISSUE IN A4.
ALTHOUGH BEING FAIR, WHAT WITH JULIES ILLNESS I CAN UNDERSTAND IT BEING PUSHED TO THE BACK BURNER, BUT ALL WE NEED IS AN UPDATE AND I DID SEND A CHEQUE OFF TO YOU AT THE END OF JUNE READY FOR THE INCREASE IN SUBSCRIPTIONS FOR JULY TO DECEMBER.
I APOLOGISE IF ANY OF THE ABOVE HAS OFFENDED YOU, IT WAS NOT MY INTENTION TO IF I HAVE THEN I'M TRULY SORRY.
BEST WISHES NIGEL

JULIE SAYS:
THANK YOU FOR YOUR LETTER NIGEL, NOW BEFORE I ANSWER IT LET ME ASSURE YOU THAT IN NO WAY HAVE YOU OFFENDED US, WHY SHOULD YOU HAVE,IT IS A GOOD AND HONEST LETTER AND DESERVES A REPLY SO HERE GOES.
THE POSTAGE PROBLEMS..? ERM GUILTY I AM AFRAID AS THE SIZE OF THE MAG INCREASED WE OVERLOOKED THE EXTRA POSTAGE, BUT REST ASSURED EVERYONE THIS PROBLEM SHOULD NOW BE RESOLVED,AND LET ME APOLOGISE TO ANY OTHER MEMBERS WHO HAVE BEEN SUFFERING FROM THIS MALADY,
NOW THE INCREASE IN MAG SIZE TO A4 WHAT HAPPENED...?
WELL AS EVERYONE KNOWS WHEN WE WENT ON HOLIDAY IN JULY THINGS REALLY DID GO FROM BAD TO WORSE FOR US AND IT IS ONLY NOW THAT WE ARE BACK TO NORMAL, THIS LINKED WITH PRINTER PROBLEMS MEANT THAT WE HAD NO CHOICE BUT LET THE A4 IDEA REST FOR A WHILE, AND THEN ANOTHER THING CAME INTO THE DECISION,THOUGH THE READERS SURVEY TO PUT IT MILDLY WAS A FIASCO, ONE THING BECAME CLEAR, ACTUALLY MANY MEMBERS PREFER A5 BECAUSE THEY KEEP THEM IN BINDERS ETC,SO REALLY ALL OF THESE THINGS COMBINED BROUGHT US TO OUR A5 DECISION, BUT DON'T THINK THAT WE HAVE DROPPED THE A4 IDEA ENTIRELY BECAUSE WE HAVEN'T,AND AGAIN LET ME APOLOGISE TO EVERYONE FOR NOT EXPLAINING EARLIER, SO ONCE AGAIN SORRY FOLKS.

WRITEBACK



VIC FROM CLITHEROE WRITES:

I'M REALLY DELIGHTED THAT YOU ARE IN FULL FLOW AGAIN AND THAT YOU JULIE ARE BACK TO FULL HEALTH. I DO REALLY TAKE MY HAT OFF (WELL I WOULD DO IF I WORE ONE) TO PEOPLE LIKE YOURSELVES WHO WORK AND ALSO MAKE THE TIME AND HAVE THE INTEREST TO PRODUCE SUCH EXCELLENT MAGAZINES THAT GIVE MANY OF US SO MUCH PLEASURE. I'M VERY APPRECIATIVE OF YOUR EFFORTS. YOU DID MAKE AN OFFER FOR ANYONE WITHOUT A FORTH PACKAGE WHO WANTED TO DO THE COURSE, I HAVE BEEN LOOKING AT JOE'S ARTICLES AND THEY SEEM VERY INTERESTING AND I WOULD LIKE TO HAVE A TRY. ARE THERE STILL ANY PACKAGES AVAILABLE?.

I'M TRYING TO GET INTO BASIC, WORD PROCESSING, MACHINE CODE, READING SPECTRUM UK FROM COVER TO COVER AND USING MY SPECTRUM TO DO HOME CORRESPONDENCE AND WHEN YOU HAVE VERY LIMITED EXPERIENCE IT TAKES A LONG TIME. I WILL WRITE TO SEVERAL OF YOU EVENTUALLY, IN THE MEANTIME I APPRECIATE YOUR EFFORTS AS I'M SURE MANY OTHERS DO.

I WILL HOWEVER MAKE PARTICULAR MENTION OF ARNOLD YATES WHO DOES'NT LIVE TOO FAR AWAY FROM ME WHO HAS BECOME A GOOD FRIEND, WITHOUT HIS CONSIDERABLE AND UNSELFISH HELP I DOUBT IF I WOULD HAVE BEEN ABLE TO WRITE AND PRINT THIS LETTER I'M SURE EVERYONE HAS ENJOYED HIS 'ASK BILL' AND 'BACK IN TIME' ARTICLES.

SINCERE BEST WISHES, VIC BISHOP

JULIE SAYS:

THANK YOU FOR YOUR GREAT LETTER VIC IT IS VERY MUCH APPRECIATED, AS REGARDS TO JOE'S EXCELLENT FORTH COURSE, WELL YOU ALONG WITH THE OTHER MEMBERS WHO HAVE WRITTEN IN ASKING FOR FORTH PACKAGES SHOULD NOW HAVE RECEIVED THEM, SO GET STUCK IN FOLKS I AM SURE THAT JOE APPRECIATES YOUR INTEREST IN HIS EXCELLENT COURSE.

CAROLINE FROM BANBURY OXON WRITES:

JUST A QUICK LINE TO THANK KEN BEER FOR HIS GREAT SERIES 'BACK TO BASICS' BRILLIANT STUFF EVEN I CAN UNDERSTAND IT, KEEP UP THE GREAT WORK KEN.

JULIE SAYS:

ON BEHALF OF KEN MANY THANKS CAROLINE, KEN HASN'T BEEN TOO WELL JUST LATELY SO LETS ALL WISH HIM A SPEEDY RECOVERY.

WRITEBACK

TERRY FROM YEOVIL SOMERSET WRITES:
I AM WRITING TO YOU TO ASK IF YOU CAN TELL
ME WHETHER IT IS TRUE THAT SPELLUNKLER THE
ADVENTURE MAG HAS FOLDED, AND IF SO IS THERE
ANY OTHER MAGS STILL GOING THAT ARE JUST
FOR ADVENTURE NUTS LIKE ME, AS TO THE BEST
OF MY KNOWLEDGE SPELLUNKLER WAS THE LAST
ADVENTURE MAG.



PS, DON'T THINK FOR A MINUTE THAT I AM
DESERTING GOOD OLD SPECTRUM UK, I AM YOUR
GREATEST FAN ME OLD MUCKERS.

??

JULIE SAYS:
THANK YOU FOR YOUR LETTER TERRY, YOU ARE NOT THE ONLY ONE TO
WRITE IN CONCERNING SPELLUNKLER, WE HAVE RECEIVED QUITE A FEW
LETTERS FROM OTHER MEMBERS, QUITE HONESTLY WE DON'T KNOW IF THEY
HAVE FOLDED OR NOT, AND WE CERTAINLY WOULDN'T COMMIT OURSELVES
EITHER WAY, AS IT IS NOT THE RIGHT THING TO DO, WE VERY MUCH HOPE
THAT IT IS JUST A RUMOUR BECAUSE THE SPECCY NEEDS EVERYONE TO
KEEP IT ALIVE.

HOWEVER I CAN HAPPILY TELL YOU THAT THERE IS ANOTHER BRILLIANT
SPECCY ADVENTURE MAG IT IS CALLED ADVENTURE PROBE, AND IF YOU
WOULD LIKE TO CONTACT THEM THEN THEIR ADDRESS IS:
ADVENTURE PROBE
BARBARA GIBB
52 BURFORD ROAD
LIVERPOOL
L16 6AQ

NOW FINALLY THE LAST PART OF YOUR LETTER TERRY, THAT WAS ME OLD
MUCKERS THAT YOU WROTE AND NOT...?

??

MAY FROM BLACKPOOL WRITES:
OI, WHATS GOING ON THEN...? ON RECEIVING ISSUE ELEVEN I TURNED TO
MY FAVOURITE PAGE DILLANS DEN AND ZERO, ZILCHO, HE WASN'T THERE
PLEASE WHY...? HAS HE DONE A RUNNER, IF SO THEN COME BACK DILLAN.

??

JULIE SAYS:
NO DILLAN HASN'T DONE A RUNNER MAY, SOMETHING AWFUL HAPPENED, HIS
COPY FOR ISSUE ELEVEN GOT LOST, A DREADFUL THING TO HAPPEN, IT
WAS ONLY AFTER THE MAG WAS WITH THE PRINTERS THAT ROY MANAGED TO
FIND IT, IT HAD SLIPPED BEHIND A MONITOR, WE WROTE TO DILLAN TO
APOLOGISE BECAUSE IT REALLY WAS UNFORGIVABLE, NOW LET ME JUST SAY
AGAIN TO DILLAN WE REALLY ARE SO SORRY AND BELIEVE ME IT WILL
NEVER HAPPEN AGAIN.

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# QUESTER'S QUORUM

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I AM SORRY TO HAVE TO INFORM YOU THAT MY PLEA FOR INFORMATION FROM MEMBERS, REGARDING THEIR OPINIONS ON ADVENTURES FELL ON DEAF EARS. I ONLY RECEIVED ONE REPLY WHICH IS A VERY SAD STATE OF AFFAIRS INDEED. THE ONLY CONCLUSION THAT I CAN DRAW IS THAT MEMBERS ARE JUST NOT INTERESTED IN THIS FORM OF GAME. I AM OF COURSE AWARE THAT WE DO HAVE A CERTAIN NUMBER WHO DO PLAY ADVENTURES, FROM THE MAIL I HAVE RECEIVED IN THE PAST. I HAVE THOUGHT LONG AND HARD OVER THE CURRENT STATE OF AFFAIRS, AND HAVE MADE A SUGGESTION TO ROY AND JULIE.

I FEEL THAT AS THE ADVENTURE SOFTWARE PUBLISHERS ARE THE ONLY PEOPLE STILL SUPPORTING THE SPECTRUM, WE MUST CONTINUE TO REVIEW THE PRODUCTS THEY WORK SO HARD TO PRODUCE. WE MUST ALSO SUPPLY THOSE MEMBERS WHO DO PLAY ADVENTURES WITH A SERVICE. UNLESS ROY OR I RECEIVE SUFFICIENT REQUESTS TO THE CONTRARY I HAVE SUGGESTED THAT WE SHOULD REPLACE THE EXISTING FORMAT WITH A SINGLE ALL PURPOSE ARTICLE. I WILL MISS DEAR OLD WOLFGANG, BUT THE MAGAZINE MUST REFLECT THE INTERESTS OF THE MEMBERS IN THE AMOUNT OF COVERAGE GIVEN TO EACH SUBJECT.

THIS ISSUE I HAVE CONCLUDED THE CURRENT EPISODE OF WOLFGANG'S LIFE IN PREPARATION FOR THE NEW FORMAT. I WILL STILL NEED ANY COMMENTS, PLEAS FOR HELP IN GAMES, AND ANY INFORMATION THAT YOU CAN SUPPLY. IF ROOM CAN STILL BE FOUND IN THE MAGAZINE I WILL STILL TRY TO RUN THE EXCELLENT SERIES OF ARTICLES ON USING 'PAW' WRITTEN BY LARRY HORSEFIELD, WHO HAS VERY GENEROUSLY GIVEN US PERMISSION TO REPRINT THEM.

I MUST OF COURSE SEND MY GRATITUDE TO JOHN THOMPSON OF LEEDS WHO DID WRITE TO ME. I WAS INTERESTED TO NOTE THAT JOHN TOOK UP ADVENTURING BY WAY OF PURCHASING AN ADVENTURE BY MISTAKE. IT IS STRANGE JUST HOW MANY OF US BECAME ENTHUSIASTS BY THIS ROUTE. ANOTHER POINT THAT SEEMED VERY RELEVANT IS THAT JOHN IS ALSO A PROBLEM SOLVING FAN, AND AS I LOVE LOGIC PUZZLE MAGAZINES, IT SET ME WONDERING WHETHER ALL/MOST ADVENTURERS SHARE OUR PASSION FOR PUZZLE SOLVING. I WOULD REALLY LOVE TO KNOW THE ANSWER AS IT MIGHT HELP PIN-POINT POTENTIAL ADVENTURERS FOR THE FUTURE. THANK YOU ONCE AGAIN FOR YOUR INTERESTING LETTER JOHN, IT SET MY MIND WORKING IN AREAS I HADN'T CONSIDERED BEFORE. IF I RECEIVE NO FURTHER REPLIES I WILL SEND THE PRIZE I OFFERED TO JOHN AT THE END OF MARCH.

WELL I WILL LEAVE YOU NOW BY WISHING ALL MEMBERS THE VERY BEST OF LUCK FOR 1995. PLEASE REMEMBER THAT I AM ALWAYS AVAILABLE TO SUPPLY ANY INFORMATION AND ASSISTANCE THAT I CAN. SHOULD ANY MEMBER NEED A LIST OF GAMES MORE SUITABLE FOR BEGINNERS THEN JUST SEND ME AN S.A.E, YOU NEVER KNOW YOU MIGHT BE MISSING A GREAT DEAL OF ENJOYMENT. UNLESS YOU GIVE ADVENTURING A TRY YOU WILL NEVER KNOW.....

AS ALWAYS PLEASE SEND ALL LETTERS TO QUESTER'S QUORUM, 101 BURY ROAD, STOWMARKET, SUFFOLK, IP14-1PD.

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## QUESTER'S REVIEW



THIS TIME SINCE I HAVE NO NEW GAMES TO REVIEW. I THOUGHT IT WOULD MAKE A CHANGE TO COVER AN AREA THAT I BELIEVE, HAS BEEN SADLY NEGLECTED BY REVIEWERS IN THE PAST. NAMELY BOOKS, AND SINCE THIS IS THE ADVENTURE SECTION, BOOKS DEDICATED TO SPECTRUM ADVENTURING. AT PRESENT I HAVE FOUR BOOKS IN MY COLLECTION AND WE WILL CONSIDER THEM ALL INDIVIDUALLY.

ADVENTURES ON THE SPECTRUM WAS WRITTEN BY THE EX ADVENTURE REVIEWER MIKE GERRARD. ALTHOUGH IT ONLY CONTAINS 126 PAGES IT IS STILL A WORTHWHILE BUY. THE FIRST 42 PAGES BRIEFLY COVER SUCH TOPICS AS ADVICE FOR BEGINNERS, WRITING AND MARKETING YOUR OWN GAME, BUYING ADVENTURES, AND CLUBS AND MAGAZINES. THE REST OF THE BOOK IS DEVOTED TO SOLUTIONS TO 42 ADVENTURES. WORTH TRACKING DOWN JUST FOR THE SOLUTIONS....

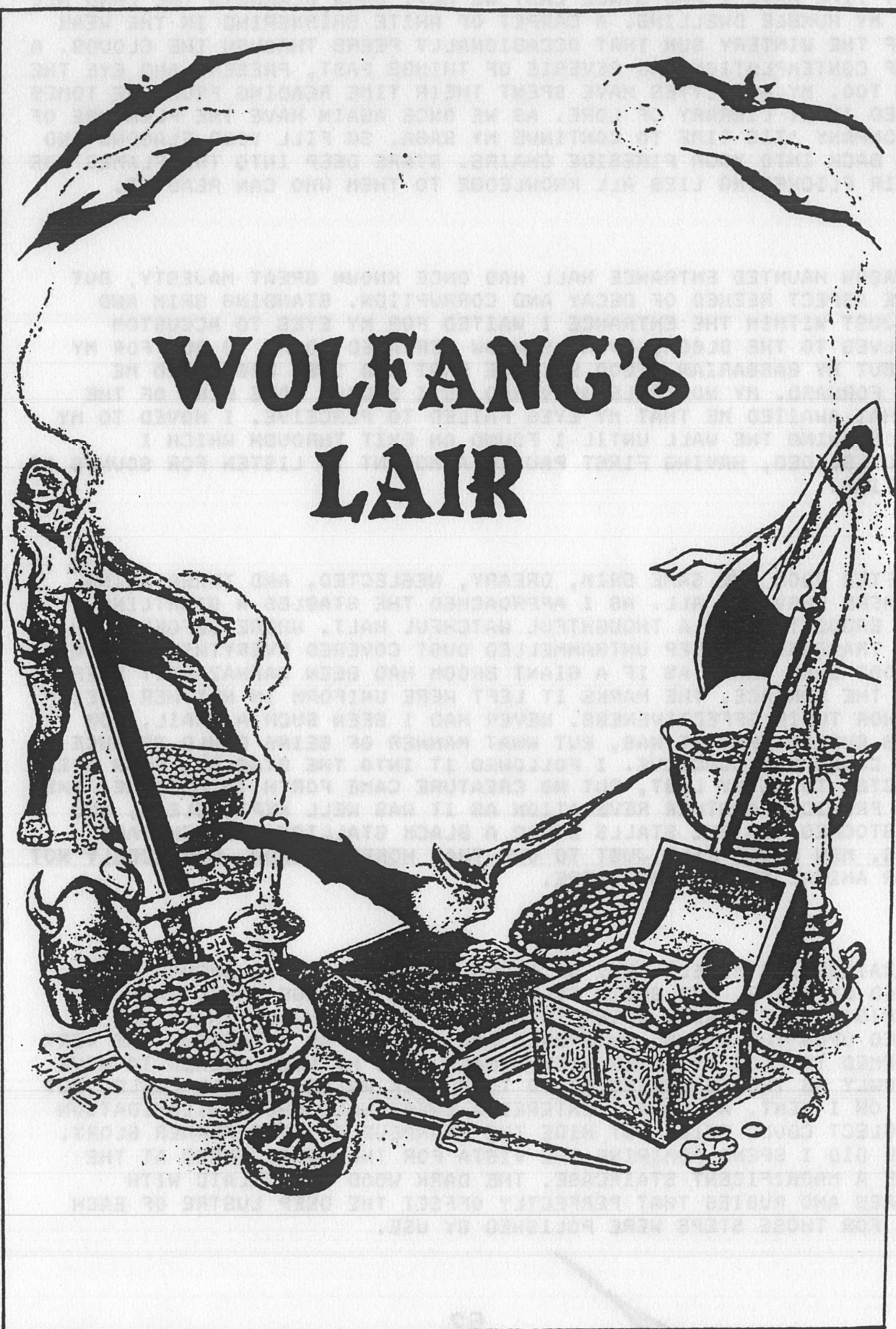
EXPLORING ADVENTURES ON THE SPECTRUM 48K BY PETER GERRARD AND PUBLISHED BY DUCKWORTH. A TUTORIAL ON WRITING ADVENTURES IN BASIC THAT COVERS THE GROUND VERY WELL. THE BOOK ENDS WITH LISTINGS FOR THREE GAMES FOR YOU TO TYPE IN. A GOOD BUY FOR THE BEGINNER IT EXPLAINS EVERYTHING IN GOOD DETAIL AND SHOULD GET A NEWCOMER OF TO A GOOD START.

INVENT AND WRITE GAMES PROGRAMS FOR YOUR SPECTRUM BY NOEL WILLIAMS AND PUBLISHED BY MCGRAW-HILL. THIS ONE IS WITHOUT A DOUBT MY FAVOURITE AS IT CONTAINS A WEALTH OF IDEAS NOT COVERED IN THE OTHERS. SUCH AREAS AS COMBAT ROUTINES, ANAGRAM PUZZLES, RANDOMLY GENERATED CIPHERS, AND THE INCLUSION OF IDEAS SUCH AS BRIBERY AND GAMBLING. NOEL KNOWS HIS BUSINESS AND LEADS YOU STEP BY STEP TO THE COMPLETION OF YOUR OWN ADVENTURE. IF YOU SEE THIS ONE ANYWHERE GRAB IT QUICKLY AS IT IS A GEM.

LASTLY WE COME TO SPECTRUM ADVENTURES BY TONY BRIDGE AND ROY CARNELL AND PUBLISHED BY SUNSHINE. THE NAME OF ROY CARNELL WILL BE VERY FAMILIAR TO ALL LONG SERVING ADVENTURERS. AS ROY OWNED CARNELL SOFTWARE AND WROTE GAMES SUCH AS: 'THE WRATH OF MAGRA'. WITH THAT PEDIGREE YOU KNOW THE CONTENTS WILL DELIVER THE GOODS, AND THEY DO. THE NOVICE IS TAKEN SLOWLY FROM CONCEPTION TO THE COMPLETION OF ADVENTURE WRITING. A VERY GOOD BUY FOR ANYONE WHO HAS LITTLE OR NO KNOWLEDGE OF ADVENTURE CONSTRUCTION. NOT IN MY OPINION AS DETAILED OR FAR RANGING AS NOEL'S EFFORT, BUT IT DOES SEEM TO BE AIMED SQUARELY AT THE NOVICE.

SADLY ALL OF THESE BOOKS ARE LONG OUT OF PRINT, BUT ARE WELL WORTH THE EFFORT REQUIRED TO TRACK THEM DOWN. TO THE BEST OF MY KNOWLEDGE THERE ARE VERY FEW PEOPLE WHO HAVE COPIES OF THESE BOOKS, SO THEY ARE VERY COLLECTABLE AND MAY BE FAIRLY VALUABLE IN THE FUTURE. IT IS WORTH NOTING THAT THE LAST THREE ARE EXCELLENT FOR ANYONE EITHER LEARNING OR SEEKING TO IMPROVE THEIR BASIC PROGRAMMING SKILL. THEY COVER MANY TECHNIQUES IN DEPTH THAT ARE VALUABLE NO MATTER WHAT TYPE OF PROGRAMS YOU WRITE.

# WOLFANG'S LAIR



A QUIET TIME HAVE I HAD SINCE LAST WE MET. SNOW BLANKETS THE LAND ALL AROUND MY HUMBLE DWELLING. A CARPET OF WHITE SHIMMERING IN THE WEAK RAYS OF THE WINTERY SUN THAT OCCASIONALLY PEERS THROUGH THE CLOUDS. A TIME OF CONTEMPLATION AND REVERIE OF THINGS PAST, PRESENT AND EYE THE FUTURE TOO. MY ACCOLYTES HAVE SPENT THEIR TIME READING FROM THE TOMES SECRETED IN MY LIBRARY OF LORE. AS WE ONCE AGAIN HAVE THE PLEASURE OF YOUR COMPANY 'TIS TIME TO CONTINUE MY SAGA. SO FILL YOUR FLAGONS AND SETTLE BACK INTO YOUR FIRESIDE CHAIRS. STARE DEEP INTO THE FLAMES FOR IN THEIR FLICKERING LIES ALL KNOWLEDGE TO THEM WHO CAN READ IT.

THE SHADOW HAUNTED ENTRANCE HALL HAD ONCE KNOWN GREAT MAJESTY, BUT NOW THE ASPECT REEKED OF DECAY AND CORRUPTION. STANDING GRIM AND STILL JUST WITHIN THE ENTRANCE I WAITED FOR MY EYES TO ACCUSTOM THEMSELVES TO THE GLOOM. EVERY SHADOW SCREAMED TO ME TO RUN FOR MY LIFE, BUT MY BARBARIAN BLOOD HELD ME FAST AND THEN PROPELLED ME SLOWLY FORWARD. MY NOSTRILS QUIVERED AS I SOUGHT SOME HINT OF THE FATE THAT AWAITED ME THAT MY EYES FAILED TO PERCEIVE. I MOVED TO MY LEFT FOLLOWING THE WALL UNTIL I FOUND AN EXIT THROUGH WHICH I SILENTLY GLIDED, HAVING FIRST PAUSED A MOMENT TO LISTEN FOR SOUNDS OF OCCUPATION.

ROOM AFTER ROOM THE SAME GRIM, DREARY, NEGLECTED, AND THREATENING ATMOSPHERE PERVADED ALL. AS I APPROACHED THE STABLES A STARTLING CHANGE BROUGHT ME TO A THOUGHTFUL WATCHFUL HALT. WHERE BEFORE EACH ROOM I TRAVERSED A DEEP UNTRAMMELLED DUST COVERED EVERYTHING, HERE THE FLOOR BORE MARKS AS IF A GIANT BROOM HAD BEEN HAPHAZARDLY SWEEP ACROSS THE SURFACE. THE MARKS IT LEFT WERE UNIFORM IN NEITHER THEIR WIDTH NOR THEIR EFFECTIVENESS. NEVER HAD I SEEN SUCH A TRAIL, FOR THIS IS SURELY WHAT IT WAS, BUT WHAT MANNER OF BEING COULD PRODUCE SUCH I COULD NOT CONCEIVE. I FOLLOWED IT INTO THE STABLES, EACH STEP I EXPECTED TO BE MY LAST, BUT NO CREATURE CAME FORTH TO MEET ME. THE STABLE PROVIDED ANOTHER REVELATION AS IT WAS WELL KEPT, CLEAN, AND FULLY STOCKED. IN THE STALLS STOOD A BLACK STALLION AND TEN PACK ANIMALS. MEN WOULD KILL JUST TO OWN THAT HORSE I KNOW, FOR SURELY NOT A FINER ANIMAL EXISTED ANYWHERE.

AFTER SATISFYING MYSELF THAT NO OTHER CREATURE LAY IN AMBUSH I RETRACED MY STEPS, AND BEGIN FOLLOWING THAT STRANGE TRAIL BACK TO IT'S ORIGIN. THE FINELY WOVEN TAPESTRIES THAT HUNG FILTHILY AND TATTERED UPON THE WALLS, WHISPERED AND RUSTLED AS I PASSED. THE VERY AIR SEEMED TO CLOG MY LUNGS WITH MENACE, AND MY LEGS SEEMED TO MOVE TOO SLOWLY AS THOUGH URGING ME TO TURN BACK WHILE I STILL COULD, BUT GRIMLY ON I WENT. AT LAST I ENTERED A GREAT HALL WHOSE DILAPIDATION AND NEGLECT COULD STILL NOT HIDE THE GRANDEUR OF IT'S FORMER GLORY. NO TIME DID I SPEND ADMIRING THE VISTA FOR THE TRAIL ENDED AT THE FOOT OF A MAGNIFICENT STAIRCASE. THE DARK WOOD WAS INLAID WITH SAPPHIRES AND RUBIES THAT PERFECTLY OFFSET THE DEEP LUSTRE OF EACH TREAD, FOR THOSE STEPS WERE POLISHED BY USE.

TAKING A DEEP TAINTED BREATH I CLIMBED THOSE STEPS, MY SWORD GRIPPED TIGHTLY IN MY RIGHT HAND WHILE MY LEFT STEADIED ME ON THE ORNATELY CARVED BANNISTER RAIL. I REACHED THE TOP WITHOUT MISHAP AND LET OUT MY BREATH WHICH I MUST HAVE BEEN UNKNOWINGLY HOLDING. BEFORE MY EYES LAY A LONG MAGNIFICENT CORRIDOR, OBVIOUSLY MAINTAINED IN IT'S ORIGINAL SPLENDOUR. MY NERVES TINGLED AS I NOTED A LIGHT ISSUING UNDER THE DOOR AT THE FAR END OF THIS AWE INSPIRING HALLWAY. FULLY THIRTY FEET WIDE AND PIERCED WITH DOORWAYS EVERY TEN FEET OR SO, IT PRESENTED A DAUNTING CHALLENGE TO ANYONE TRAVERSING IT'S LENGTH. WIPING MY PALMS ON MY JERKIN AND RE-GRIPPING MY SWORD I WAS JUST TAKING MY FIRST HESITANT STEP, WHEN A MIGHTY ALMOST FERAL SCREAM RENT THE AIR. FROM AN OPENING ABOUT FORTY FEET AWAY A CREATURE LEAPT INTO THE CENTRE OF THE AISLE AND SCREAMED ANEW IT'S CHALLENGE TO ME. 'CARVEL', FOR IT COULD ONLY BE HE, FOR SURELY NO MORE NIGHTMARISH A CREATURE INHABITED THIS MAUSOLEUM FOR DEAD HEROES.

HELL SPAWN INDEED FOR HUMANKIND COULD NEVER HAVE CONCEIVED SUCH A MONSTROSITY. THE TRUE HERITAGE OF THIS MIGHTY BEAST I COULD NOT CONJECTURE FOR IT LAY SOMEWHERE BETWEEN SIMIAN AND REPTILIAN. LONG POWERFUL MUSCULAR ARMS ENDED IN THE PAWS OF AN APE, BUT PAWS TIPPED WITH LONG SHARP CRUEL TALONS. THE BROAD HEAVILY MUSCLED CHEST WOULD HAVE GRACED THE FINEST GORILLA, BUT NO SIMIANS BODY WAS COVERED IN A VIPERS SKIN. LEGS THAT WERE SQUAT, THICK AND UGLY CARRIED THAT BULK WITH EASE, ESPECIALLY WHEN AIDED BY THE EIGHT FOOT LONG LIZARD'S TAIL. THE REPTILIAN EYES WERE SET IN A SIMIAN HEAD, BUT A SERPENTS SCALES AND A LIZARDS CREST BELONGED TO NO MONKEY EVER BORN. THE FORKED TONGUE SLID RESTLESSLY IN AND OUT OF THAT AWFUL MOUTH AS VENOM DRIPPED FROM THE COBRA FANGS. NEARLY SEVEN FEET TALL HE STOOD, AND EVERY INCH BETOKENED DEATH. MY DEATH.....



LOOSENING MY GRIP UPON MY BLADE'S HILT I BALANCED IT LIGHTLY IN MY HAND AS MY FATHER HAD TAUGHT ME. HOLDING IT ACROSS MY BODY READY TO PARRY, THRUST, OR CUT I SLOWLY STALKED FORWARD. LIGHTLY I TROD READY TO LEAP ASIDE FROM THE CHARGE I EXPECTED ANY MINUTE. 'CARVEL' MADE NO MOVE, JUST STOOD THERE AN UNHOLY GRIN SUFFUSING HIS FACE, SO SURE WAS HE OF ANOTHER VICTIM. TIME CHANGED IT'S RHYTHM FOR IT SEEMED AN ETERNITY AS I CREPT TOWARDS HIM, BUT ONLY A HEARTBEAT WHEN I FINALLY STOOD A SCANT SEVEN FEET FROM HIM.

I LEAPT HIGH TO MY LEFT AS THAT TAIL SWUNG WITH CRUSHING FORCE. STILL IT GRAZED MY LEG AND BLOOD SEEPED. AGAIN AND AGAIN I EVADED THAT WHIP LIKE INSTRUMENT OF DEATH. MY STRENGTH WAS SLOWLY EBBING AS EACH BLOW INFLICTED MORE DAMAGE. MY SWORD BOUNCED FROM THAT ARMoured APPENDAGE. SWEAT RAN FREELY SLOWLY BLINDING ME. MY MIND WHIRLED. SURELY THERE MUST BE A WAY.

I LEAPT AGAIN BUT THIS TIME STRAIGHT UP. AS THAT MASSIVE FLAIL PASSED UNDER ME I LANDED UPON IT. GRIPPING WITH ALL MY WANING STRENGTH I WAS CARRIED WITH IT. THE MOMENTUM THREW ME OFF BEHIND HIM AS IT REACHED THE END OF IT'S SWING AND REVERSED. ALTHOUGH DAZED AND HALF BLIND I ROSE AND JUMPED ON HIS BACK.

LEGS WRAPPED ABOUT HIS WAIST I SLASHED REPEATEDLY AT HIS HEAD. MY SKIN BURNED WHERE THE VENOM DRIPPED ON MY LEGS. CLAWS RAKED FOR ME. HE SPUN TRYING TO DISLodge ME. AROUND AND AROUND WE WENT. SCREAMS, CURSES AND HOWLS RENT THE AIR. STILL I GRIMLY HUNG ON, BUT FAILED TO PIERCE THAT HIDE. TIME WAS HIS ALLY AND MY FUNERAL PYRE..

WE NEARED A WALL. ONE CHANCE , AND NOW, OR DEATH. I LET GO MY HOLD AS WE SPUN IN OUR DANCE OF DESTRUCTION. THROWN AGAINST THE WALL I USED THE MOMENTUM TO PROPEL MYSELF STRAIGHT BACK. SWORD RAISED HIGH I PLUNGED IT DOWNWARD. THE TIP SKEWERED HIS EYE AND PIERCED HIS BRAIN. I RELEASED THE HILT AND JUMPED CLEAR. AS WELL I DID FOR SURELY I WOULD HAVE BEEN CRUSHED IN HIS DEATH THROES. THE INHUMAN SCREAMS BEAT SAVAGELY AGAINST ME, BUT SLOWLY HE STAGGERED AND FELL. LIMPING FORWARD I PULLED MY SWORD FREE AND SANK DOWN UPON THE FLOOR. RESTING AGAINST THE WALL I WIPED BLOOD AND SWEAT FROM MY EYES, AND WAITED FOR MY STRENGTH TE RETURN. MY LEGS MUST BE STEADY AND MY ARM STRONG BEFORE I DARE APPROACH THAT GRIM PORTAL THAT AWAITED ME.



PRESENTLY I ROSE AND STRETCHED MY MUSCLES TO EASE THE SORENESS AND STIFFNESS THEY CONTAINED. WHEN SATISFIED WITH MY FLEXIBILITY I STRODE PURPOSELY DOWN THE HALLWAY, PUSHING THE PAIN AND DISCOMFORT INTO A FAR CORNER OF MY MIND AND IMPRISONING THEM THERE. REACHING THE DOOR I FOUND IT TO BE AJAR, SO I GENTLY PUSHED IT OPEN WITH THE POINT OF MY SWORD. NEVER BEFORE HAD I SEEN SUCH A TREASURE AS NOW LAY BEFORE ME. THE ROOM WAS LIGHTED WITH TORCHES SET INTO THE WALL, AND FURNISHED WITH A WEALTH OF EXPENSIVE HANGINGS AND FURNISHINGS. A GREAT FOUR POSTED DOUBLE BED GRACED ONE WALL, THE BEAUTY AND ART THAT HAD GONE INTO THE CREATION OF IT'S DRAPES AWED EVEN MY PRIMITIVE SOUL. ALL THIS I NOTICED IN A BRIEF BLANCE FOR MY GAZE WAS DRAWN AND HELD BY THE OVER-SPILLING CASKETS THAT LINED THE WALLS. COINS, JEWELLERY, GREAT GEMS, AND GOLD AND SILVER ARTEFACTS FILLED THEM WITH SUCH PROFUSION THAT THE CASKETS COULD NO LONGER HOLD THEM. THE FLICKERING ILLUMINATION OF THE TORCHES DANCED OVER THE MYRIAD OF GLEAMING AND SHINING SURFACES, CAUSING THEM TO SHIMMER WITH A HYPNOTIC EFFECT.

'WELL, WELL. ANOTHER HERO TO SATE THE HUNGER THAT INFUSES EVERY FIBRE OF MY BEING'.

THE MUSICAL BUT DEADLY VOICE CUT INTO MY TRANCE AND FORCED MY GAZE TOWARDS THE SPEAKER. AT THE RIGHT HAND END OF THIS MAGNIFICENT BOUDOIR STOOD THE MOST DESIRABLE WOMAN THE MALE MIND COULD POSSIBLY CONCEIVE OF. A BODY PETITE BUT FIRM AND STRONG WAS SUPPORTED BY LONG DELICIOUSLY CURVED LEGS. THE FACE WAS CREATED BY A GOD, LONG DARK LASHES, HIGH SENSUOUS CHEEKBONES, AND A SKIN CRAFTED FROM PUREST SILK. LONG FLOWING TRESSES CARESSED THE DELICATE SCULPTURED NECK AND SLEEK SHOULDERS. SMALL WELL GROOMED HANDS WERE THE PERFECT TERMINATION OF THE SLENDER AND GRACEFUL ARMS. IT WAS THE EYES THAT TOLD THE TRUTH, FOR ALTHOUGH THEY WERE PERFECTLY SHAPED DEEP BLACK POOLS OF DESIRE, THE EVIL THAT LURKED THEREIN COULD NOT BE DISGUISED. A WOMAN THAT NO MAN COULD RESIST AS THE VERY AURA THAT SURROUNDED HER EXUDED ALLUREMENT. A WOMAN SUCH AS THIS WAS INDEED SCULPTURED BY A DEITY, BUT ONE FROM THE DEEPEST STYGBIAN DEPTHS OF THE ABYSS.

HER EYES LOOKED INTO MINE AND LOCKED THEM TOGETHER. SLOWLY SHE UNDULATED TOWARDS ME, THE SWEET VOICE CARESSING EVERY FIBRE OF MY SOUL AS SHE APPROACHED.

'SUCH SWEET TORMENT KNOW THOSE WHO DARE ENTER MY DOMAIN. AN ETERNITY OF SUFFERING IS THE BOUNTY I BESTOW UPON THEM. BUT YOU MY FINE YOUNG WARRIOR, YOU HAVE SLAIN MY ONLY BEGOTTEN SON, AHHH THE TORTURE I HAVE IN STORE FOR YOU.'

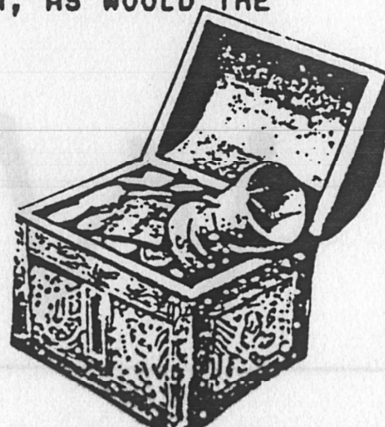
CLOSER EVER CLOSER SHE SWAYED. THE INTOXICATION WAS RISING FAST WITHIN ME. THE BLOOD ROARED THROUGH MY VEINS AS MY EYES BEGAN TO SHROUD WITH A RED HAZE.

'YOUR VERY SOUL WILL I REND. UNTIL THE END OF TIME YOU WILL SUFFER. THE PAIN, THE UNENDURABLE HONEY LADEN PAIN, WILL BE INTENSIFIED BY THE KNOWLEDGE THAT YOUR GREATEST DESIRE IS TO POSSESS SHE WHO HAS VISITED IT UPON YOU.'

THE ROARING IN MY MIND WAS REACHING A CRESCENDO AS MY LIMBS TREMBLED AND MY DESIRE MOUNTED. TEN FEET THEN NINE, AS INEXORABLY SHE NARROWED THE DISTANCE BETWEEN US. THE LUST FILLED ME TILL I COULD CONTAIN IT NO LONGER.

I LUNGED THE LAST SEVEN FEET, MY BLADE WHISPERING IT'S DEATH SONG AS IT CLOVE THE AIR AND SEVERED HER HEAD FROM HER BODY. I SET THE BLADES POINT TO THE FLOOR AND LEANED ON THE POMMEL AS I STARED AT THE LIFELESS FORM. EVEN IN DEATH THE SHOCK AND DISBELIEF WERE ETCHED INTO HER EYES. SAMARA HAD FAILED TO UNDERSTAND THE DANGER OF ROUSING THE LUSTS IN ONE OF MY HERITAGE, FOR THE GREATEST LUST IN THE HEART OF A TRUE BARBARIAN WARRIOR IS THE BLOOD LUST, AND IT OVERPOWERS ALL OTHERS WHEN HIS VERY EXISTENCE IS THREATENED.

TOMORROW I WOULD LOAD THE PACK HORSES WITH AS MUCH WEALTH AS THEY COULD CARRY, AND RIDE THE GREAT BLACK STALLION TO MEET MY DESTINY. TONIGHT, AFTER I HAD REMOVED THE CARCASS, I WOULD SLEEP IN THAT MAGNIFICENT BED AND DREAM OF THE DRINKING, WENCHING AND AYE THE ADVENTURING TO COME. LIFTING MY ARMS I POINTED MY BLADE SKYWARD AND ULULATE THE VICTORY CRY OF THE HIGHLAND BARBARIAN. THE VERY WALLS SHRANK BACK AND TREMBLED AT THAT FEROCIOUS EXALTATION, AS WOULD THE WORLD IN THE DAYS TO COME.



COLLECTION

COMPUTERS

IV`E GOT THEM EVERYWHERE  
TAKING UP SPACE  
UP AND DOWN THE STAIRS

IT`S MAINLY SPECCY`S  
AND A COMMODORE OR TWO  
A B.B.C. B  
AND CASIOS TOO

GAMES UP TO THE CEILING  
JOYSTICKS TOO  
A HALF DOZEN INTERFACES  
BUT NOT 1 & 2

THIS IS MY STORY  
I KNOW YOURS IS THE SAME  
CAN`T WAIT TILL THE WEEKEND  
TO ADD TO MY COLLECTION AGAIN

P. J. MACDOUGALL

SPREAD  
THE  
WORD!